IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication AUGUST 10, 1961

Ed Nano

★ For Bigger Shares of Tough Markets—

Equipment Makers Beef Up Service Staffs p. 39

Behind Britain's Bid to ECM p. 45

Roundup Report on Shot Peening p. 67

Digest of the Week p. 2-3

another torture test for leaded alloy

This guide bushing is a much abused part in a pneumatic rock drill—subjected to severe shock loads and a shattering type of vibrational stress. It is machined from a bar of lead-treated* Aristoloy 8620, carburized and hardened to a 58-63 Rockwell "C". When GARDNER-DENVER switched to lead-treated steel, they happily discovered production jumped 42%. Feed rates, drilling, turning, forming, boring, and cut-off operations could also be increased. Tool life was extended 20 pieces between grinds.

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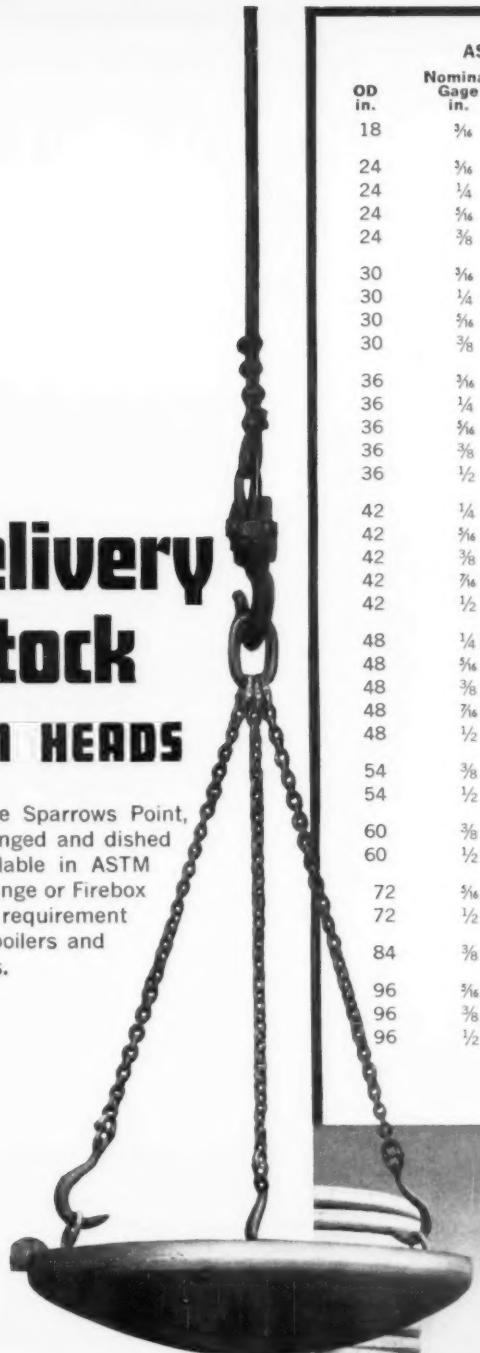
18	3/16	18	1 1/8	1 1/2	23
24	3/16	24	1 1/2	2	41
24	1/4	24	1 1/2	2	54
24	5/16	18	1 1/2	2	67
24	3/8	18	1 1/2	2	79
30	3/16	30	1 7/8	2	60
30	1/4	24	1 7/8	2	80
30	5/16	24	1 7/8	2	98
30	3/8	24	1 7/8	2	117
36	3/16	36	2 1/4	2	84
36	1/4	30	2 1/4	2	111
36	5/16	30	2 1/4	2	137
36	3/8	30	2 1/4	2	163
36	1/2	30	2 1/4	2	216
42	1/4	36	2 5/8	2	148
42	5/16	36	2 5/8	2	183
42	3/8	36	2 5/8	2	217
42	7/16	36	2 5/8	2	252
42	1/2	36	2 5/8	2	286
48	1/4	42	2 7/8	2	190
48	5/16	42	2 7/8	2	234
48	3/8	42	2 7/8	2	278
48	7/16	42	2 7/8	2	322
48	1/2	42	2 7/8	2	366
54	3/8	48	3 1/4	2	350
54	1/2	48	3 1/4	2	459
60	3/8	54	3 5/8	2	427
60	1/2	54	3 5/8	2	560
72	5/16	66	4 3/8	2	515
72	1/2	66	4 3/8	2	795
84	3/8	78	5 1/8	2	828
96	5/16	90	5 7/8	2	933
96	3/8	90	5 7/8	2	1095
96	1/2	90	5 7/8	2	1428



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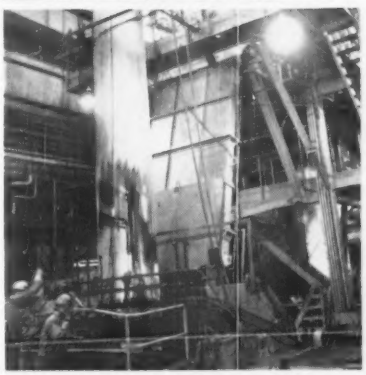
Special This Week

How Service Sells Modern Machinery

Modern equipment needs specialized servicing. That's why service personnel are taking on new stature among metalworking's equipment manufacturers. Often, service people are the principal contact between buyers and suppliers of machinery. p. 39

ON THE COVER: (left to right): Frank Gotch, service representative of Warner & Swasey Co., Cleveland; machine operator Homer Gladfelter; John Fortuna, vice president, Clark Manufacturing Co., Cleveland.



Wider Galvanized Goes on the Line

Armco Steel Corp. has a new 72-in. continuous zinc-coating line at its Middletown, O., works. It's the widest of its kind ever built. The company is betting that wide galvanizing will soon be a hot product. It's ready with an $8.5 million line. p. 42

Shot-Peening Extends Metal-Part Life

Have you checked all the benefits of shot-peening in your operations? It has more to offer than you may think. Untold amounts of trouble can be avoided, thanks to the shot-peening technique. It increases endurance limits and fatigue strengths. p. 67

Next Week

Vacuum Furnace Melts Huge Ingots

A new 40-ft tall, consumable-electrode vacuum-melting furnace turns out 40-in. diam ingots. Consumable vacuum melting insures ultraclean steel. Next week's report tells how modernization and improvement of equipment team up to produce finer steels.

Now you can automate your production of small precision parts with the new O-AC Chucker. Profitable on all lot sizes, it sets up fast like a turret lathe. Easily holds tenths. And one man can operate more than one machine. Contact the Field Engineer from The **Warner & Swasey** Company, Cleveland.

Defense, Butter, and Pap: Let's Give Up One of Them

We need more defense. After the challenge Mr. Kennedy laid down to Mr. Khrushchev, we cannot afford to be caught bluffing.

We also need to take the water out of defense spending: Get more value than we have been getting by eliminating foolish waste.

Eventually, we will have to pay higher taxes because of more defense. The President did not want to panic us. But it seems quite evident that he will move quickly and suddenly when the occasion requires it.

Those who know what a fix we are in also know that things will be rough in the years ahead, in business, in government, and in our everyday affairs. So far, a national emergency has not been declared. But it is by no means ruled out for the future.

Already we hear cries to do without butter. The same arguments were used in the Korean War period. They carry about as little weight now as they did then.

This nation fortunately is capable of carrying on a large defense project and, at the same time, making butter.

Without butter there can be no way to pay the bills for government-inspired and controlled defense projects. It takes private initiative and private capital to keep machines going, people working, railroads running — and the Treasury collecting.

Maybe we do need a little more Spartan attitude. But, as yet, we don't need a garrison state. If the time comes when we do, we will be able to face it properly.

Private enterprise, private workmanship, and a free and healthy economy must help to pay for defense. This too will supply the permanent formula for fighting Communism on all fronts.

There is one thing though we need to do—now. We can cut down—and out—the pap that is being dribbled away in foreign aid and in farm subsidies. We can eliminate or forestall welfare tinsel, grandiose school programs, and a whole list of unnecessary vote-getting projects.

These welfare state gimmicks create cries for more pap; these push us farther down the road to bankruptcy. It is bad enough to skirt bankruptcy because of defense measures. To head that way by trying to play God for everyone—everywhere—who is in want (or wants) will eventually make defense unnecessary. There won't be much to defend!

Tom Campbell

Editor-in-Chief

"The Gravity Kid" shows how

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You see, in conventionally welded tubing, gravity pulls the molten metal down into the tubing. This forms a bead that is difficult to remove by cold working. And cold working can lead to undercuts that become focal areas for corrosive attack.

Contour-welded tubing, however, is welded at the bottom. Gravity still pulls the molten metal down. But now the weld area corresponds to the contour of the tube. There's virtually no weld bulge on the inside surface. And even on the O.D., the weld seam closely conforms to the tubing contour.

Contour-welded tubing is smoother, too, than seamless. That's because it's formed from uniformly rolled strip steel, whereas seamless is extruded or pierced.

But get full details on this corrosion-resistant tubing. Send for our free 48-page manual on Contour-welded tubing in sizes from 1/8" to 40" O.D.—in stainless and high alloy steels, titanium, zirconium, zircalloy and Hastelloy.*

*U.S. Patent 2,716,692

*Trademark Haynes Stellite Co.

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Durable Goods Stocks Level

Durable goods inventories in June totaled $30.2 billion, about the same as in May.

In June, as in May, withdrawals from durable goods stocks just about matched additions to stock. This is not exciting in itself. But an end to inventory liquidation is signaled. This is good news.

Since last year at the same time, durable goods stocks have been liquidated to the tune of about $2 billion. This liquidation is now halted. The wheel is ready to spin in the other direction—inventory buildup.

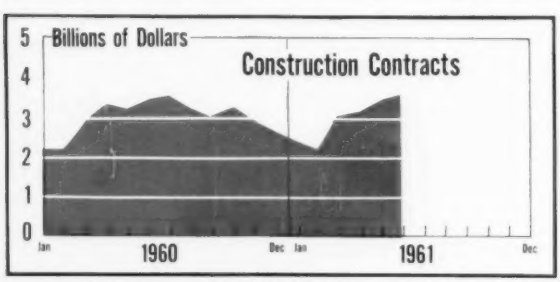
Berlin Crisis Speeds Recovery

The Berlin crisis is bound to change the time table of the business recovery. It hasn't yet, but it will as well-funded defense plans break loose.

Look for a sharp pickup in the entire economy by early next year. At that time, regular recovery forces will be strengthened by the defense buildup. And while spending for hardware won't be heavy at that time, the psychological effect will be spreading by January 1.

Building Scores June Gain

Construction contracts in June totaled $3.6 billion, up 4 pct over the same month last year. Biggest gain



was made in non-residential building, up 10 pct to $1.2 billion. Residential building rose 5 pct to $1.6 billion. Only heavy engineering was down—off 6 pct to $800 million.

The biggest single gainer was apartment building, up 28 pct. Contracts for single-family houses were off slightly from last year.

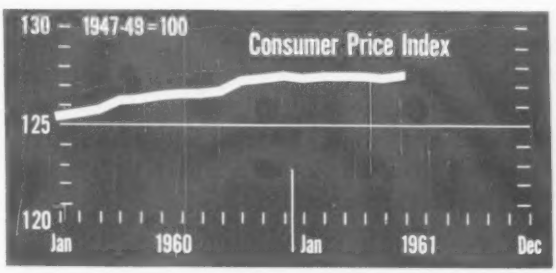
The number one hope in construction is that housing will soon pull its own weight. But despite easier and cheaper home buying credit, customer demand remains spotty. It's likely to remain so during 1961.

New High for Consumer Prices

The cost of living, as reflected by the Labor Department's consumer price index, hit a record high of 127.6 in June. But the rise from May (127.4) was small.

A short-term influence pushing the index to this point was a shortage-produced price rise for some fresh foods (food makes up 28 pct of the index weight). A long-term influence was, and is, a rise in costs of services. These costs, despite the recession, have risen 2 pct since last June.

But there is still no hint of inflation. While the price index rose in June to 127.6 pct of 1947-49 levels,



"real" spending power of factory workers rose to 129.7 pct of wage levels for the same year.

Profits Make A Comeback

A report by the First National City Bank of New York shows that profit margins of manufacturers rose from 5.4 cents per sales dollar in the first quarter to 6.2 cents in the second quarter. Profits are now near the pre-recession level of 6.3 pct.

The bank says improved profits are due to increased sales, not due to any change in cost-price relations. It will take more than further sales increases to assure better profits.

With prices watched by Washington, the "cost" element in cost-price relationship is due for a new look. It is probably more than coincidence that two recently named top executives — at Chrysler and GE — are finance men, or cost specialists.

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June 27, 1961—The Glidden Company announces a new one-coat finish for electrical enclosures with the weather-resisting properties of traditional two-coat systems.

This newest in the family of Glidden one-coat SUPER NUBELITE finishes has just passed the stringent tests of a leading independent testing institution and is approved for suitable exterior electrical applications.

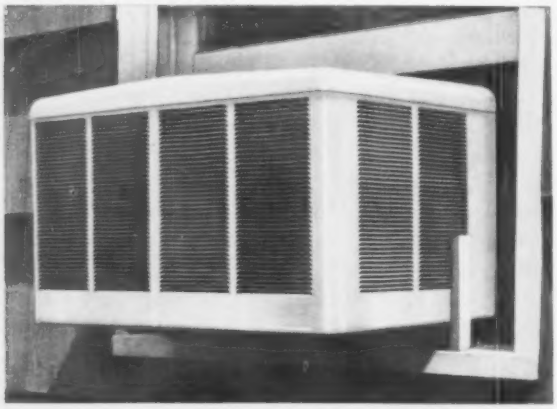
The battery of tests included salt spray, ultra-violet light and water, moist carbon dioxide-sulphur dioxide and moist hydrogen sulphide—all proving the durability of SUPER NUBELITE.

SUPER NUBELITE is applied in a film thickness of 1.5 mils and can attain theoretical coverage of 700 square feet per gallon per mil.

Other one-coat SUPER NUBELITE finishes are already in production on refrigerators, freezers and fluorescent light fixtures. Two-coat SUPER NUBELITE is now being used on clothes washers, dryers and other electrical appliances.

For complete information on one-coat SUPER NUBELITE finishes, call your Glidden representative or write direct.

Air conditioners and other exterior electrical enclosures can be finished with SUPER NUBELITE for superior weather protection at one-coat economy.



Key to approval by leading independent testing institution was salt spray test. Above panel, coated with one-coat SUPER NUBELITE shows creepage of less than 1/16 inch along scribes after 2208 hours exposure.

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UAW: Talks Open In Farm Equipment

United Auto Workers' Union has opened negotiations on another front. This one is the farm equipment industry where it represents about 100,000 workers.

International Harvester Co. and UAW started talks last week. Next week Deere & Co. and Allis-Chalmers Manufacturing Co. sit down with the union. And the following week Caterpillar Tractor Co. joins in.

As in auto industry talks, UAW has announced a "flexible" approach. Not unexpectedly, the union's demands are similar, too: Job security is the key bargaining issue.

Goldberg Poised To Plunge Into Disputes

The international crisis has given Labor Secretary Arthur J. Goldberg a new springboard from which to jump into strikes and labor disputes. The patriotism pitch will get a big play. And the first big test may come in auto contract talks.

The appeal seems to have worked in the missile base hassle. Mr. Goldberg says man-days lost due to strikes at 21 missile sites dropped to an all-time low of 209 in July. This represents about 0.0002 pct of the more than one-million man-days worked.

However, he also warns the Administration will seek a law banning strikes at missile sites if the voluntary no-strike, no-lockout pledge should fail.

Labor Antitrust Bill Doomed as Usual?

Senate Labor Committee is discussing legislation which would make labor unions subject to Federal antitrust laws. It is doubtful this perennial bill will get past the talking stage.

The bill (S. 2292), introduced by Sen. Strom Thurmond (D., S. C.), would subject unions to the same antitrust laws as corporations.

It is doubtful the bill will get anywhere this year or in the future. As in the past, a combination of labor backers and the Administration won't let it get to the hearing stage.

Retraining Program Finds Easy Going

President Kennedy's worker retraining program—to cost $263 million—is finding easier Congressional going than any piece of labor legislation backed by the Administration.

A one-sided passage by the House and Senate is expected shortly.

The program would retrain 235-000 workers put out of their jobs by the advance of automation.

USWA: Workers Return At McLouth Steel

McLouth Steel Corp. workers last week voted to go back to work at three Detroit area plants. The vote ended a 13-day strike over safety standards. But it provided no solution to the long-standing dispute.

Officials of USWA Local 2659 called for the vote after McLouth filed a $1.7 million damage suit.

UAW: Sharpens Strike Claws

▪ The UAW is sharpening its strike claws as the Aug. 31 contract deadline nears on new Big Three auto contracts.

And it looks more and more as if General Motors Corp. is being groomed as the target. The union revived the price-profit argument against GM; and it has threatened to seek Federal help in getting a look at the automaker's books.

This week top union negotiators, such as Leonard Woodcock, vice president in charge of the GM Dept., have taken to the road. The union is staging a series of worker rallies at auto-making centers. The purpose is to get rank-and-file reaction to what the union calls Big Three "lethargy" toward bargaining.

Regardless of the outcome of the rallies, the report will be "a willingness to strike if the companies force us to."

This will be followed by a special executive board meeting next week. The meeting will probably nail-down which of the Big Three the union will strike if a contract isn't signed by the end of the month.

So far, the choice would have to be GM or Ford—with GM as the favorite. Verbal sparring has been loudest there.

Mr. Woodcock has said the union would rather not work without a contract after Aug. 31. Timing of a strike against GM could be deadly. The company builds its final 1961 car this week. Next week will bring first output of 1962's — and inventories of 1961-model cars are shrinking.

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★ Tax Reform Due in '62

The U. S. Treasury Dept. is laying the groundwork for a general overhaul of tax laws, including depreciation, next year. Treasury officials told The IRON AGE they are now preparing data to support an overall tax reform in 1962.

Preparing the data has become a big problem because of a midstream switch in approach to the overhaul.

Before the costly military buildup by the President, The Treasury Dept. was examining ways to lower the tax rate. Now, more thought is being given to how to liberalize the laws but at the same time get more revenue from taxes.

Treasury is giving high priority to depreciation reform. Spurred on by industry dissatisfaction, the department is trying to analyze the long-overdue depreciation survey of business.

Completion of the survey has been held up by the complications of tabulating and analyzing 2000 depreciation tables from 54 industry groups. Treasury officials say now the survey will be ready by January, in time for President Kennedy's expected tax reform message. Though the President has promised to overhaul tax laws, he did not say when. However, Treasury tax experts are working toward a January deadline.

While tax reform, such as depreciation, to aid the businessman is a possibility next year, tax increases of some kind are almost certain because of the switch in approach.

Because 1962 is an election year, with all representatives and a third of the Senate before the voters, the Administration will not risk public ire by attempting to raise personal income tax.

The only answer lies in corporate taxes and "loophole" closing. The Treasury Dept. is studying several methods of boosting the tax take from business while revising the tax system.

■ Businessmen-FTC Get Together Faster

A new era of Federal Trade Commission enforcement has begun.

FTC officials say business consent to settle charges has become the rule, rather than long drawn-out cases.

Consent settlements between the FTC and businessmen will hit a high spot the middle of this month. The turnabout stems from President Kennedy's major reorganization of the agency.

Under the old rules, some cases dragged on for years—16 years in the case of one company. The new rules are ending this practice.

Businessmen now are required to negotiate a consent settlement of charges against them within 40 days, or lose the right to negotiate. They have 10 days to inform the FTC of willingness to negotiate, and 30 days to reach an agreement.

■ Congress Probes R&D Fund Sharing

Congress may restrict the amount of government funds for independent research and development projects in industry.

The government pays a share of independent research undertaken by companies in their own behalf, if the Dept. of Defense is a customer. Regulations allow government to pay a share of a company's normal business costs, equal to the Pentagon's percentage of business.

Sen. Hubert Humphrey (D., Minn.), says $150 million of government funds spent on private research not directly related to supplies and services for Defense is subject to abuse by industry.

■ Lead-Zinc Aid Compromise Advanced

A compromise subsidy plan for the lead-zinc industry is making its way through Congress. Whether it can make it all the way this year remains a question.

The compromise, sponsored chiefly by Rep. Ed Edmondson (D., Okla.) provides for a four-year subsidy program with total payments to miners set at $16.5 million.

Under the new bill, subsidies would be paid to miners of less than 1500 tons each of lead and zinc the first year; 1200 tons the second year; 900 tons the third year; and 600 tons the fourth year.

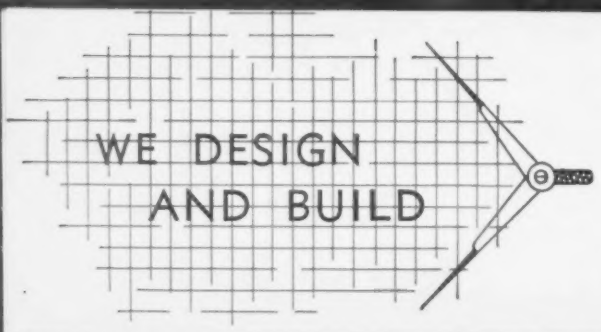
The bill sets the price at which subsidies would begin at 14.5 cents a pound.

■ Import Hearings On Agenda Again

The special House committee which cancelled hearings on steel and aluminum imports last month will meet next week.

The committee, headed by Rep. John H. Dent (D., Pa.), cancelled the hearings because staff members fought over the purpose of the import study.

The hearings, in which Congressman Dent hopes to find reasons for "the creeping paralysis of unemployment" in the steel and aluminum industries, will be held Monday, Tuesday and Wednesday in Washington.



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Britain and the EEC: A U. S. Squeeze?

With Britain's bid to join the European Economic Community, a message is signaled to U. S. industry. This is especially true as other nations now in the European Free Trade Assn. show signs of following Britain.

This means U. S. industry will be facing a united economic front in Europe, if negotiations are successful. And most foreign trade experts queried by The IRON AGE feel a single European trading bloc will become a reality.

Here is a question being asked by American businesses with a stake in foreign trade:

Would a united European market rule out trade by U. S. companies that can't afford to build plants in Europe?

One Common Market expert, H. W. Young, deputy chief of the Washington office of the Common Market, says the answer is an unqualified "no." He points out that the economic growth rate of the EEC has been about five to six pct. This is about twice that of the U. S.

"This growth rate," says Mr. Young, "along with an exploding population and higher living standards, will create a gross demand that cannot be filled by EEC industry." He notes a nine pct gain in U. S. exports to the EEC for the first quarter of this year compared with the same period of 1960.

This happened after heavy internal tariff reductions. And products scoring the biggest export gains were also made by Common Market industries.

"Another favorable point for U. S. trade," says Mr. Young, "is that the common tariff rate that will face U. S. industry will be lower than the rates of individual countries." He points out that the tariff rate of Britain on industrial products will fall from 9.1 to 5.9 pct of product value when that nation joins the EEC.

"And consider," he notes, "that all quotas on U. S. products with EEC nations will be discarded after this year. This will be a great help to U. S. exporters of certain products, including autos."

A government foreign commerce expert points out another aspect favorable to American exporters: "The large and growing development loan funds with the EEC will help build up associate member nations. This will, in time, make them better customers for U. S. products."

But the enlarged European trade bloc will mean negative factors for U. S. industries, too. American companies can expect more competition from imports. The Federal government can hardly be expected to negotiate trade concessions as favorably with a united Europe as it could with individual nations.

Also, big efficient industrial complexes are growing in EEC environment. Mergers, and stripping of duplicated facilities by companies on an inter-nation basis, are breeding giants that can easily cross the ocean and raid other markets.

And, of course, it is difficult to jump a tariff wall and still compete in a huge area where no nation imposes a duty on another.

New U. S. Trade Policies on Metals?

New U. S. trade policies on metals may come out of the Intra-American Economic Conference when it ends next week. U. S. representatives at the conference in Montevideo, Uruguay, have discussed problems of U. S.-Latin American policies on tin, copper, lead and zinc.

The U. S. will consider becoming a full member of the International Tin Agreement. But it will not propose international trade agreements on other metals.

U. S. Exports Gain; But Still Behind '60

Total U. S. exports in June climbed slightly over the total for May.

According to statistics just released by the Dept. of Commerce, June exports were valued at $1.59

billion. That's two pct above the May export value of $1.55 billion. But it's down from June, 1960, when exports were valued at $1.62 billion.

Exports for the first half of this year, on a seasonally adjusted basis, are valued at $19.8 billion. If this trend develops, it would mean 1961 exports will top last year's total value of $19.5 billion.

Metals and metal products continued to gain on overseas shipments during the first half. In the first five months of this year, for example, exports of steel mill products totaled 744,000 tons. In May, 159,000 tons were shipped abroad —a gain of 21,000 tons over April.

ONE KEY TO COST CONTROL IN

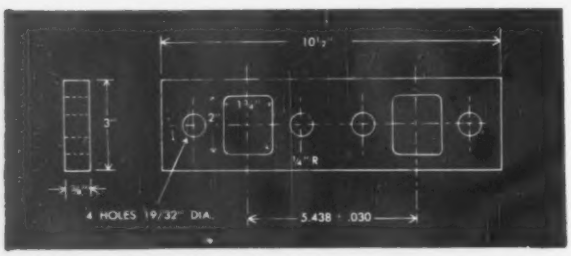
Savings like these through Metalogics*

As part of your purchasing function, you're naturally searching for ways to contribute to the over-all profitability of your company.

The following examples are typical of how Ryerson Metalogics sparks real savings for hundreds of companies—by helping them search out new materials, new methods and new machines to do the job better.

Your Ryerson representative is "Metalogics-trained" to help you value-analyze selection, fabrication and application problems. Get his constructive ideas soon, and see how he can help you select and apply material from our vast stocks. It's the "Metalogical" thing to do.

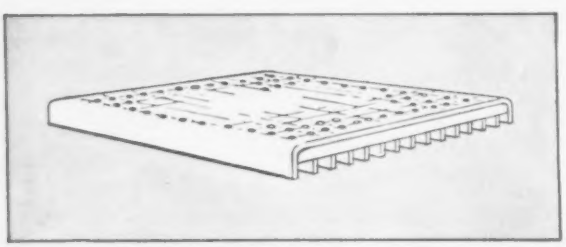
**The Ryerson science of giving optimum value for every purchasing dollar.*



Saved: $100 per thousand

PROBLEM: Muffler manufacturer required accurately finished mounting plates made from ⅜" x 3" bar. Cutting bars to size, burning 1¾" x 2" holes and drilling four 19/32" holes proved time-consuming and expensive.

SOLUTION: Ryerson recommended that they eliminate cutting, burning and drilling operations by stamping the part from Ryerson forming-quality plate. One operation instead of three cut costs $100 per thousand pieces and quickly justified the small initial investment in dies.



Suggestion saves 85%

ASKED FOR: Customer wanted 1" hot rolled plate to cover about 80' of 24" open trench. Plate was to be cut into 24" x 27" segments—each containing 900 ⅜" holes to filter the product.

RECOMMENDED: After studying application and costs, Ryerson recommended a design combining perforated light plate, formed to channel shape, and grating for structural support. Ryerson's experience and imagination saved 85% of the original cost.

Machine cut rings solve problem

PLATES REQUESTED: Ryerson was asked to bid on supplying ¼" Type 410 stainless in 27½" square plates. Material was to be used for orifice plates for 16" burner, subjected to elevated temperatures.

RINGS RECOMMENDED: Going beyond material specs, the Ryerson representative found that the customer intended to cut plate into 27⅛" diameter length with 13.120" bore—and then mill 12 slots in outer diameter for expansion relief. Knowing the application, Ryerson recommended supplying machine-cut rings in which slots could then be punched rather than milled. Production savings enabled switching to Type 304 at less cost than Type 410 with slots milled.

2 metalworking machines for the price of 1

A fabricator of stainless steel kitchen equipment was recently in the market for a new squaring shear. The one under consideration had a gap-type frame which would enable him to do an important notching operation—necessary for certain sink tops. After careful study, a Ryerson machinery specialist recommended *two* pieces of equipment instead of one at no increase in total cost. The first, an under-driven shear. The second, a universal-type sheet metalworking machine that would do the required notching, plus many other jobs—adding versatility to the entire operation.

Production upped 30%

BEFORE: Job shop was using MT 1015 tubing in the manufacture of this coupling. Machinability was satisfactory, but rising costs of operation led to a search for ways to economize.

AFTER: Careful study by the Ryerson representative brought about a change in material. He recommended using Ledloy® 170 tubing, which increased machining speed to 170 sfm and stepped up production 30%. Ryerson's stocks include the widest range of fast-machining alloys.

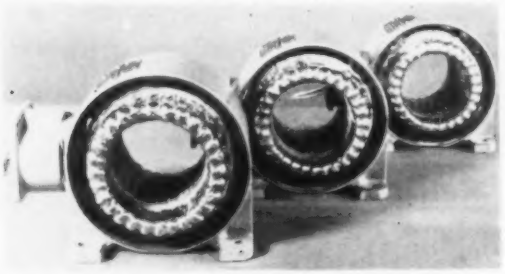
STEEL • ALUMINUM • PLASTICS • MACHINERY

RYERSON STEEL®

Joseph T. Ryerson & Son Inc., Member of the INLAND® Steel Family

Foil Fights Corrosion

Combining plastic with thin stainless steel boosts corrosion resistance, with little or no increase in cost. In some units, plastic is normally



STAINLESS JACKET: Banishes corrosion.

used; but it doesn't stand up too well. However, adding a stainless-foil coating drastically curtails corrosion and increases service life.

Tests Physical Properties

Physical research faces mushrooming demands as new theories clamor for verification. How well these needs are met may depend on research tool development. With ingenious attachments, a new electron microscope points the way toward refined lab instrumentation. It heats, chills, or stresses a test specimen. Motion pictures permanently record moment-to-moment changes.

Cuts High-Strength Metals

One of today's critical metallurgical problems centers on the difficulty of machining the new high-strength metals. However, the tool steel industry is fighting to keep pace with metal progress. For instance, Continental Copper & Steel Industries, Inc. has come up with a special tool-steel alloy. It contains chromium, vanadium, tungsten, molybdenum and cobalt, plus traces of carbon. By combining Rc 70 hardness with toughness and resiliency, it bridges the gap between conventional tool steels and carbides.

Super-Cold Electromagnets

Several companies report development of superconductive columbium-zirconium alloys that hold a magnetic field of 30 kilogauss. These alloys promise powerful electromagnets at a fraction of present cost. However, technical problems have blocked commercial production of wire. Now, Wah Chang Corp. claims success in fabricating 0.010-in. wire in 1000-ft lengths.

Path to Stainless Copper?

An important first step in the development of stainless copper is actually seeing what uncoated copper looks like. Dr. Charles Moore, technical director of The Copper Products Development Assn., explains: "After it's cleaned, copper forms a very-thin oxide coating on its surface." This happens so quickly, it takes a fast electron microscope to glimpse uncoated copper. Dr. Moore has arranged for such a study. It may shed light on an approach to stainless copper.

Bubble Chamber's Core

An advanced bubble chamber is slated for a major role in Argonne National Labs' new zero-gradient synchrotron. Heart of the chamber is

MONSTER MAGNET: Gets machining check.

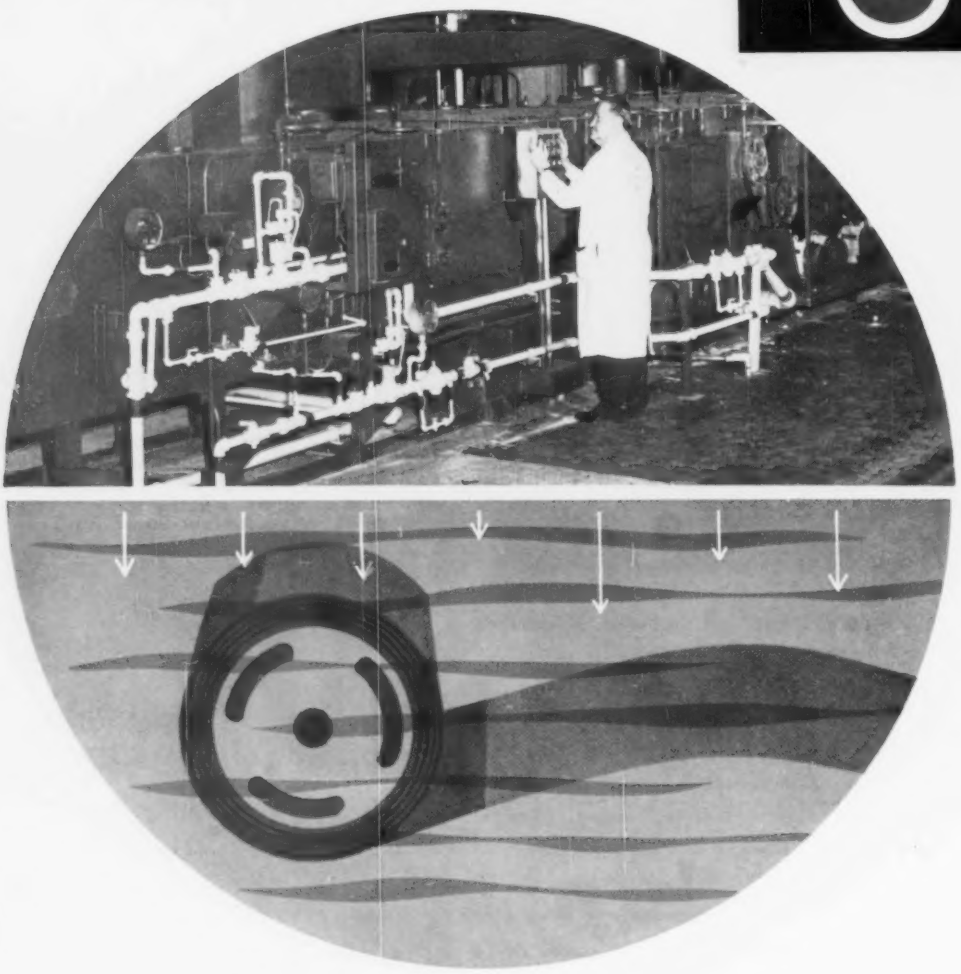
a huge magnet. This heavyweight will tip the scales at a staggering 170 tons, after its machined forgings are doweled and bolted together.

Speeds Crystal Research

An automatic, X-ray diffraction method will speed up research on the atomic structure of crystals. It relies on a digital computer for fast results. The computer generates a tape which controls a special X-ray diffractometer. Data from the experiment are recorded on punched tape and fed back into the computer. It then correlates and corrects the data. Test results are printed out for analysis by a crystallographer.

Pennsalt System Approach for better cleaning

EQUIPMENT CHEMICALS



Stainless strip cleaned to "white glove" perfection

A major reason why stainless steel strip made by Superior Steel Division of Copperweld Steel looks uniformly stain-free *after* annealing is the thorough job of cleaning *before* annealing . . . by a team of Pennsalt chemicals and equipment.

The equipment. An automatic, multi-stage Pennsalt washer provides a cycle of alkali brush wash, brush rinse, steam flood and drying—"white glove" cleaning that completely removes mill soils which might burn on in the furnace with resultant discoloration. Strip up to 24 inches wide, in gauges from .010 to .050, is handled at speeds up to 90 feet per minute.

The chemicals. One of the standard Pennsalt cleaners, a concentrated, granular alkaline material designed specifically for spray or soak cleaning of steel or brass, was recommended by Pennsalt field men for the specific soils encountered at Superior Steel.

Pennsalt System Approach. Because we make both chemicals and equipment, we can team them for top quality and lowest costs . . . in cleaning, phosphating, drawing lubrication and pickling.

Nationwide service. Pennsalt specialists analyze your needs, aid start-up, then live with your line. Write or call today.

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Pennsalt Chemicals of Canada Ltd., Oakville, Ontario • Industrial Química Pennsalt, Mexico City

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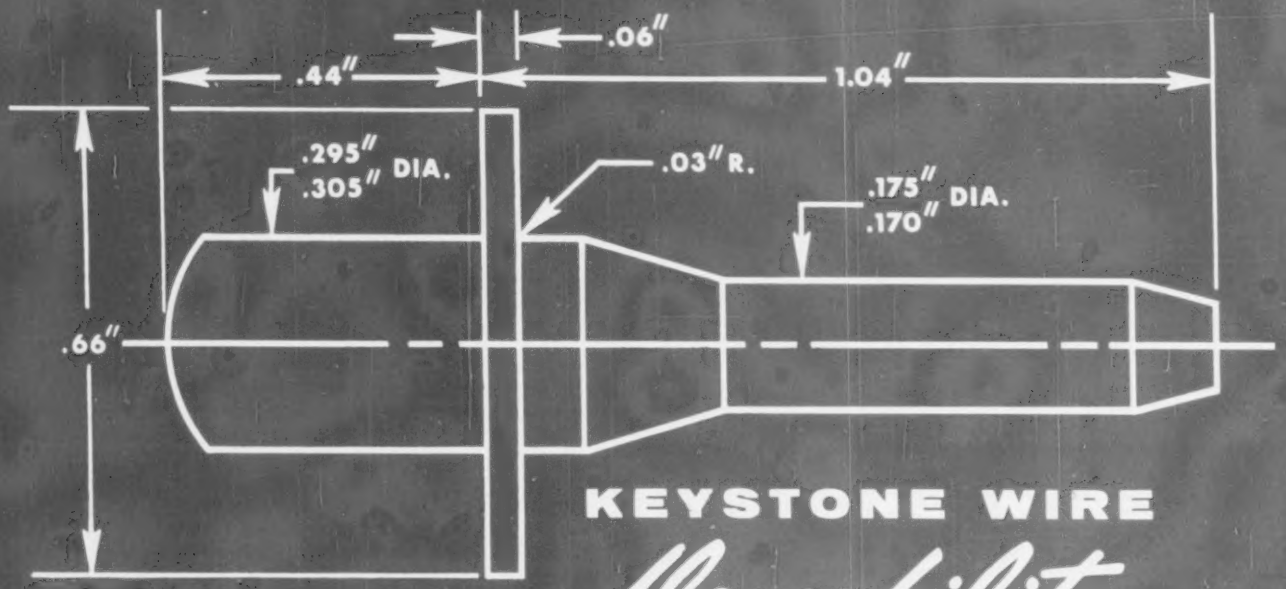


KEYSTONE WIRE *flowability*

ELCO

3 TIMES ACTUAL SIZE

makes possible

- **64% wire reduction**
- **Large thin collar**
- **Low-cost production**

for Elco Tool and Screw Corporation

To cold head a plunger-selector lever, vital part in an automobile shift mechanism, is a four-blow operation successfully done by Elco Tool and Screw Corporation, Rockford, Illinois. Rigid specifications call for a 64% wire reduction from the original .306″ diameter wire. They also designate forming a .660″ diameter collar while holding a section of the plunger shaft to a 15° ±0° 30′.

Dean Tollefsrud, Purchasing Agent for Elco, reports, "We have had excellent results from Keystone Steel & Wire Company C-1038 Special Process Wire in making this plunger." Adds Louie Zanin, Process Engineer, "Production runs and die life have been good for this difficult heading job. We have been successful in forming this part even though specifications are critical."

Keystone's Research and Metallurgical departments have developed special thermal treatments and closely controlled manufacturing procedures to insure uniform temper and structure throughout each coil. So, when your specifications call for major extrusions and severe upsetting, remember the flowability characteristics of Keystone Wire. If you desire, long continuous coils are available. We shall be glad to help you solve your wire problems. Write us for further details.

Keystone Steel & Wire Company, Peoria, Illinois

KEYSTONE

WIRE FOR INDUSTRY

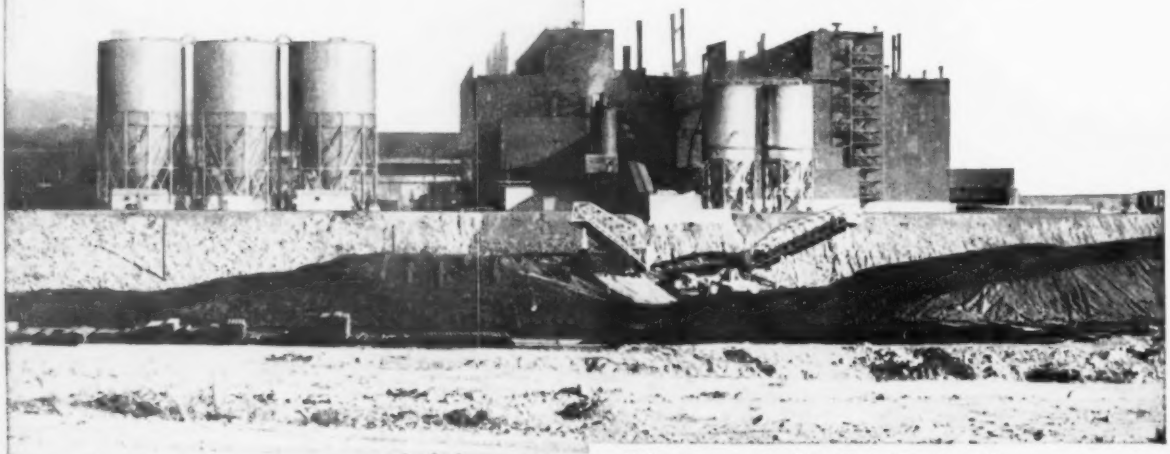
MANUFACTURED AT PEORIA, ILLINOIS, U. S. A.

How Pneumatic Conveying Helps Make New Mining Process Economically Practical

Taconite processing is typical of the many varied, cost-saving applications for Fuller Pneumatic Conveying.

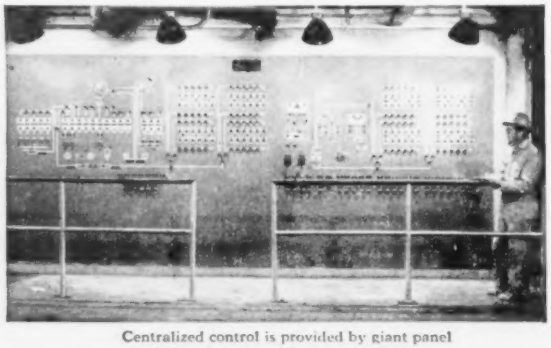
They're turning low assay iron ore into rich pellets on the Mesabi these days. Moving additives for pelletizing, Fuller plays a special role in this feat of engineering and production economy.

Fuller Pneumatic Conveying Systems are carrying fine anthracite screenings, soda ash, and bentonite from siding to storage to processing—with speed, safety, sanitation, and efficiency. With few moving parts to wear out and powered by inexpensive low-pressure air, Fuller Pneumatic Conveying Systems speed dry bulk materials *anywhere that a pipeline can be run:* under ground, up through floors, around corners . . . for far greater distances and at substantially lower cost than possible with mechanical conveyors.



Four Fuller Pneumatic Systems can speed more than 307 long *tons* of additives through this huge Taconite Pelletizing Plant in a single day.

Fuller Pneumatics Can Work For You, Too—as easily and profitably as it does in a score of industries from baking to mining to paper. If you move dry bulk materials, write today and learn how you can move further—for less—with air.



Centralized control is provided by giant panel designed and manufactured by Fuller.

See Chemical Engineering Catalog for further details and specifications

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Productivity

■ The recent series of articles by R. N. McMurry and J. F. Sullivan on increasing productivity has resulted in one of the largest influx of letters in IRON AGE history. Some of the letters concerning the first article in the series ("How to Improve Productivity; Why Some Attempts Fail," IA—July 13) follow.—Ed.

Sir—"This article truly represents problems with which management is faced today."—Leo J. Tyrrell, Jr., General Fireproofing Co., Youngstown, O. "I found your article to be very interesting and thought-provoking."—J. P. Morgan, deputy area manager, U. S. Atomic Energy Commission. "I am impressed by the good sense shown in this article."—Walter B. Powell, Altadena, Calif.

"We find much of interest in this article as it fits into other articles and reading material which we use in our training program."—W. A. Dawson, National Revenue, Canada. **"I have just finished reading this article and found it factual and realistic. The subject of productivity is without a doubt the most significant in industry today and certainly the most misunderstood from the employee standpoint. If Mr. McMurry and Mr. Sullivan can get their point across they will have rendered a good service not only to industry but to its employees as well."**—A. J. Yannatta, Rockwell-Standard Corp., New Castle, Pa.

"We are greatly interested in and impressed by this article."—W. A. Oakey, vice president, Roanoke Iron & Bridge Works, Inc., Roanoke, Va. "I was exceedingly interested in this article."—Larry G. Neff, Crucible Steel Co. of America, Midland, Pa. "This article is one of the best I have read and I would like to pass reprints out to our foremen."—W. C. Phelps, Bootz Manufacturing Co., Inc., Evansville, Ind. **"I feel there is a vast amount of information in this article which we can use to good advantage here in our plant."**—J. A. Cahill, Walker Brothers, Conshohocken, Pa. "It was with a great deal of interest that I read this article."—R. A. Botsford, Packard Electric Div., General Motors Corp., Warren, O.

Not Routine

Sir — Regarding your July 13 Techfront item on the status of the honeycomb welding diffusion process, we want to point out that the process is now under development. Production with the process is not routine at this time. We expect it to have routine production capability by 1962 at the earliest.—W. S. Powell, president, Hexcel Products, Inc., New Gardenia, Calif.

Modernization

Sir—Your article entitled "U. S. May Insure New Tool Loans" (IA—June 29, p. 41) is definitely what we small business people could use so that we can modernize and mechanize to meet foreign competition.—Louis F. Urban, president, Jennings and Co., Chicago.

"Well, in a way it's a month's vacation. . . . I take two weeks, then my boss takes two weeks."

W. C. "Bill" Pine, our chief metallurgist says . . .

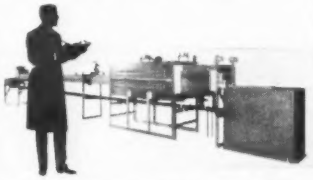
production-proved LAC-200 Series furnaces pay dividends on precision

BRAZING

Talk about controlled heat . . . easy operation . . . versatility . . . economy — and you're describing a Hayes Model LAC-200 Series Conveyor Brazing Furnace.

MULTI-ZONE HEAT CONTROL permits exact settings of temperature profiles — for quality work on each brazing, alloying, metal bonding or soldering cycle. When working with parts of unequal section, a pre-heat zone insures stabilized heat throughout the mass.

CONSTRUCTION MATCHES THE JOB. If an exothermic atmosphere is to be used, open chamber construction reduces equipment cost. For more refined atmospheres, muffles are available, which provide a baffling action to prevent creeping of temperature profiles.



WORK HANDLING IS EASIER, too, with a Hayes Model LAC-200 Series Furnace. Loading tables combine with constant belt feed to make this a remarkably high-production unit, per dollar cost and per foot of floor space.

VERSATILITY COUNTS. While designed for brazing, your Hayes furnace can double for annealing, hardening, and other heat treat operations. It's a bull for work!

WHATEVER YOUR BRAZING NEED — from silver (1100°F range) to platinum (3400°F range with type M-Y or Vacuum Furnaces), Hayes know-how in equipment and engineering can come up with a RESULTS GUARANTEED answer . . . tested in our lab. on full-production equipment . . . proven by scores of successful installations in industry. Bulletin 5711A gives LAC details. For your copy, write C. I. Hayes, Inc., 821 Wellington Ave., Cranston 10, Rhode Island.

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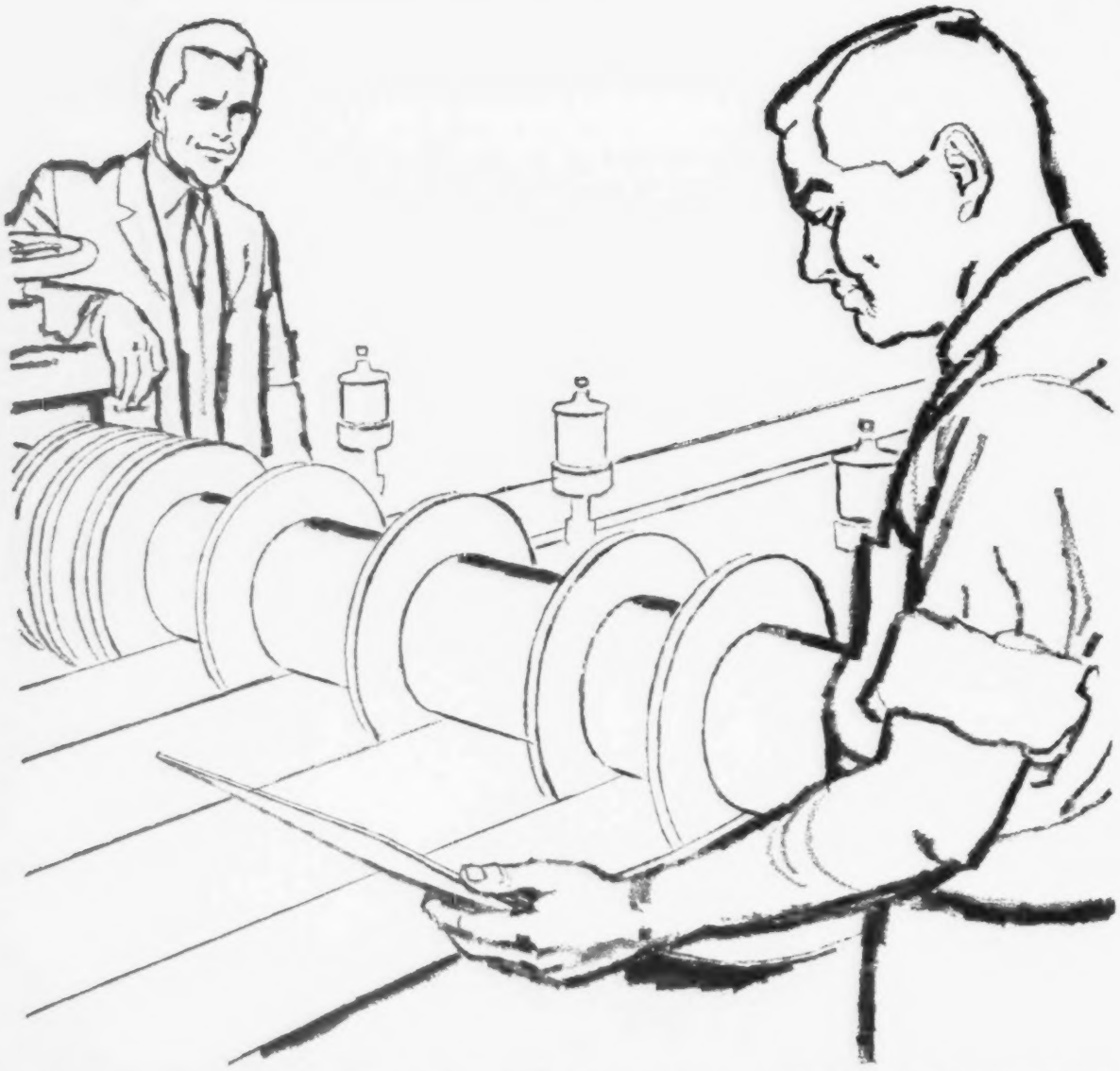
It pays to see Hayes for metallurgical guidance, lab. facilities, furnaces, atmosphere generators, gas and liquid dryers, Pow-R-Trol (TM) control units.



Can you get longer edge life from your SLITTER KNIVES?

A·S·K for the answer!

AMERICAN SHEAR KNIFE

The answer is yes when you use slitter knives from A.S.K. (American Shear Knife Company). A.S.K. Slitter Knives last longer, stand up better under the heaviest jobs, reduce maintenance and replacement costs!

Why? Because A.S.K. has devoted years of research to the selection of proper alloys, and correct techniques in heat treating, precision grinding. For slitter knives that last longer, improve your slitting operation . . . Ask A.S.K.!

FREE HANDBOOK—Want a handy reference on the installation, operation and maintenance of slitter, shear and chipper knives? A.S.K. has the answers in an 88-page manual. For free copy, write American Shear Knife Co., Homestead, Pa.

FATIGUE CRACKS

Service Plus

It's been a long time since a manufacturer of metalworking equipment could stand on price and delivery alone.

Advances in manufacturing equipment, whether it's a giant rolling mill for a new steel facility, or a machine tool for an electronics manufacturer, have upgraded service to a point where it has equal status with engineering, sales, and other departments.

When a new piece of equipment is installed, service men from the equipment company are there to supervise the installation; then to teach operators how it's done.

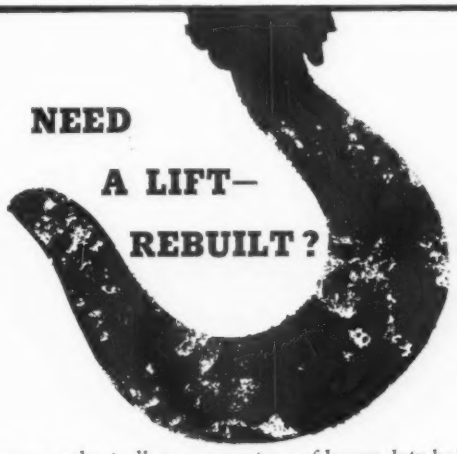
On Assignment—To report on this new dimension of service, Cleveland editor Tom Rohan contacted some of the top companies in the field. He was a logical man for the story because within a stone's throw of his Cleveland office is a complete cross section of industry: Machine tool builders, heat treating equipment manufacturers, steel mill equipment makers, and all the elements of industry who make metalworking equipment.

Furthermore, after eight years of covering Cleveland's industrial complex, Tom was on firm and familiar ground in contacting the top people both in the field and in executive offices as he developed the story of the new concepts of service. The full story is this week's Special Report, p. 39.

One bit of advice that was passed along to us, and which we will hand out free of charge: The service engineer is now one of the front men for the company. The company is frequently identified by the quality of its service personnel.

Incidentally, although Tom is assigned to the Cleveland area, his work also takes him far afield. For example, he is our specialist in iron ore and this sideline often takes him far from Euclid Ave. (see photo, above, right).

OUT OF THE OFFICE: On ore story assignment, Cleveland editor Tom Rohan stands by shovel at iron ore mine in Minnesota's Mesabi range.



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Pollock Engineering is the nation's leading redesigner and remanufacturer of heavy-duty cranes. Contact us, outlining your requirements.

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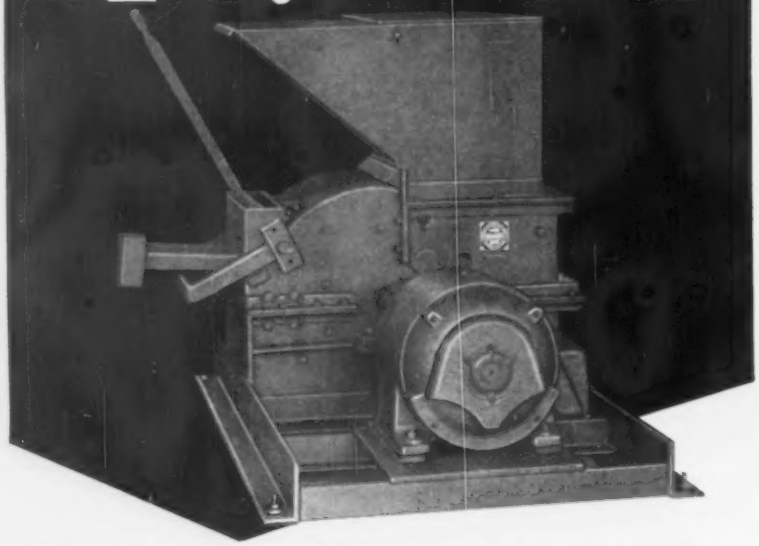

AMERICAN ROLLING RING METAL TURNINGS CRUSHER

Designed for the plant with a smaller volume of metal turnings. If your plant produces 20 to 200 tons of metal turnings monthly, the American 1800 Crusher will bring you additional profit on the sale of crushed turnings plus savings in cutting oil, man-hours, plant space, and tool maintenance.

3 IMPORTANT WAYS AN AMERICAN 1800 CRUSHER BRINGS NEW PROFITS!

- **SHOVELLING TURNINGS BRING $3 TO $4 MORE PER TON!** A daily crushing capacity of only 2 tons will produce an additional profit which will pay for the equipment **in less than a year** and give you a handsome profit thereafter.
- **30 TO 50 GALLONS PER TON IN RECOVERED CUTTING OIL!** American-crushed turnings release oil more freely, are easier to handle in chip wringer, and prolong tool life through more liberal use of reclaimed oil. **Savings in cutting oil alone can pay for an American Crusher.**
- **UP TO 75% LESS STORAGE SPACE NEEDED — EASIER HANDLING!** Valuable savings in factory space; chips load heavier, easier in freight cars — substantially cut shipping costs.

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COMING EXHIBITS

Plastics Materials Show—Applications Clinic, August 15-16, Santa Monica Civic Auditorium, Santa Monica, California.

National Chemical Show—Sept. 5-8, International Amphitheatre, Chicago. (Chicago Section, American Chemical Society, 86 E. Randolph St., Chicago 1.)

Industrial Building Exposition—Sept. 25-28, New York Coliseum.

Detroit Metal Show—October 23-27, Cobo Hall, American Society for Metals.

MEETINGS

AUGUST

American Institute of Electrical Engineers — Pacific general meeting, August 23-25, Hotel Utah, Salt Lake City, Utah.

American Society of Mechanical Engineers — West Coast Conference, August 28-30, University of Washington, Seattle, Washington.

Metallurgical Society of AIME—Semiconductors conference, Aug. 30 - Sept. 1, Ambassador Hotel, Los Angeles. Society headquarters, 29 W. 39th St., New York.

SEPTEMBER

Air Moving and Conditioning Assn., Inc.—Annual meeting, Sept. 10-14, The Greenbrier, White Sulphur Springs, W. Va. Assn. headquarters, Guardian Bldg., Detroit.

International Industrial Conference—Sept. 11-15, Masonic Memorial Auditorium, San Francisco.

Society of Plastic Engineers, Inc.—Regional Technical Conference, Sept. 12, Central Indiana Section, Severin Hotel, Indianapolis.

(Continued on P. 23)

MEETINGS

(Continued from P. 22)

Non-Ferrous Founders' Society—Annual meeting, Sept. 17-21, Shawnee Inn, Shawnee-on-the-Delaware, Pa. Society headquarters, University Bldg., 1604 Chicago Ave., Evanston, Ill.

AEC Welding Forum — Annual meeting (classified), Sept. 20-22, Southwest Research Institute. Institute headquarters, Granada Hotel, San Antonio, Texas.

Industrial Electronics Symposium —Sept. 21-22, Bradford Hotel, Boston. Institute headquarters, 51 East 42nd Street, New York 17.

Pressed Metal Institute — Annual meeting, Sept. 24-28, The Grand Hotel, Point Clear, Ala. Institute headquarters, 3673 Lee Rd., Cleveland.

American Welding Society — Fall meeting, Sept. 25-28, Adolphus Hotel, Dallas, Texas. Society headquarters, 33 W. 29th St., New York.

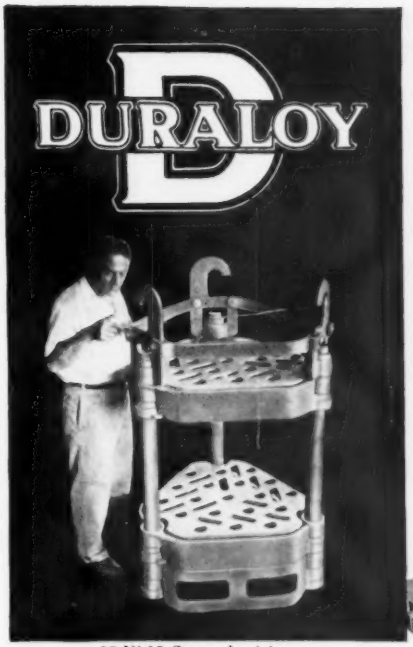
Assn. of Iron and Steel Engineers —Annual convention, Sept. 25-28, Penn-Sheraton Hotel, Pittsburgh. Assn. headquarters, 1010 Empire Bldg., Pittsburgh.

Steel Founders' Society of America —Annual Meeting, September 25-26, The Homestead, Hot Springs, Virginia.

American Die Casting Institute Inc. and The Die Casting Research Foundation—Annual meeting, Sept. 27-28, Edgewater Beach Hotel, Chicago. Institute headquarters, 366 Madison Ave., New York.

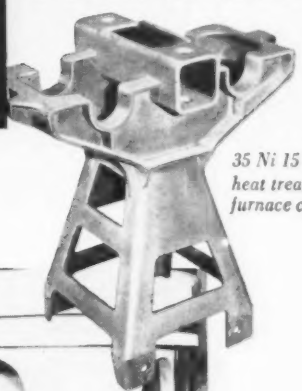
American Production and Inventory Control Society—Annual national conference and technical exhibit, Sept. 28-29, Pick-Congress Hotel, Chicago. Society headquarters, 330 S. Wells St., Chicago 6.

Purchasing Agents Assn. — 14th Pacific Inter-Mountain Conference, Sept. 29-30, Westward Ho Hotel, Phoenix, Arizona.



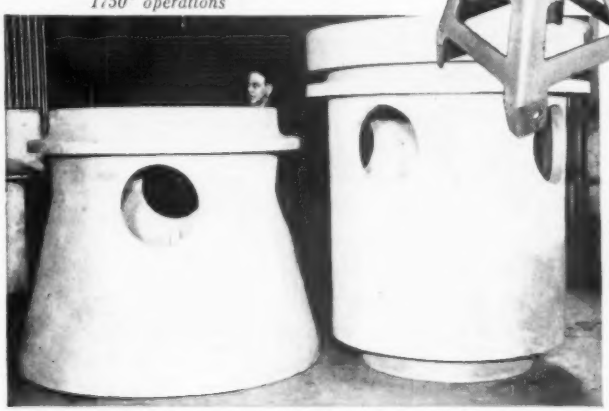
35 Ni 15 Cr carburizing furnace casting

High Alloy CASTINGS for METAL TREATING



35 Ni 15 Cr heat treating furnace casting

Heat treating stools for 1750° operations



● ***Sound castings to withstand the high operating temperatures and wide temperature ranges without deformation.***

Nickel-chrome castings have long been the 'standard' for heat treating and annealing operations—and for close to forty years Duraloy castings have been considered by many metal working plants to be the 'standard' for meeting the industry's sound casting requirements.

The three Duraloy castings illustrated typify the kind of work we do for the metal treating plants.

We're in a position to cast any shape or size and of any alloy to meet your requirements.

Send for Bulletin G-261.

ALLOY CASTING INSTITUTE ACI MEMBER

The DURALOY Company

OFFICE AND PLANT: Scottdale, Pa.

Eastern Office: 12 East 41st Street, New York 17, N. Y.
Chicago Office: 332 South Michigan Avenue, Chicago, Illinois
Detroit Office: 1025 Maple Road, Troy, Michigan
Houston Office: 4101 San Jacinto, Houston, Texas

"We had 18-20 hours downtime every time we changed heats. With strip, we just hook on from heat to heat. No downtime."

"With strip we use smaller blanks to produce the same part."

"By using strip we save downtime, die repairs."

"Rejects have drooped from about 8% to less than 1%."

"We found we couldn't afford the low cost of sheet."

Read why Target Stamped Products, Inc., Kinsman, Ohio, switched from strip to sheet—and then back to strip. Comments are Harvey Haynman's, Target's president:

"We thought we'd give sheet a try back in 1958. The low cost looked too good to pass up. Today, you'd have a hard time finding a piece of cold rolled sheet around the shop.

"We were absorbing 18-20 hours of downtime every time we changed heats. With strip, we just hook on from heat to heat. The characteristics are the same from heat to heat and coil to coil. We don't waste time adjusting our dies.

"Strip saves us metal. We can use smaller blanks to produce the same part. I'd say we save from 1/16" to 3/32" of metal per part. That's a lot of steel when you're turning out 25-30 million parts a year.

"We don't have gauge problems now. The strip we buy is always rolled within our working tolerance. We work to a plus or minus .0025 inches.

"So far, strip hasn't given us lamination troubles. It doesn't take much lamination to give you big trouble in a deep drawing operation. When the metal separates, part may stick to the punch while part stays in the cavity. As another blank transfers to the same station, there's a double smash and the die is ruined. That hasn't happened with strip. Saves a lot of downtime and die repair.

"Strip takes a deep draw without thinning out on you. Its uniform temper pays off when you're turning out Silent Blocks where both the ID and OD have to be right or the part's a reject.

"All in all our rejects have dropped from about 8% to less than 1% since we switched back to strip.

This mark tells you a product is made of modern, dependable Steel.

Outer metal bushing of a Silent Block. Target Stamped Products turns out millions of these each year for the auto industry. Silent Blocks are used in the suspension systems of all American cars—about eight to a car. To produce the piece, Target must work to a plus or minus .0025" tolerance or the Silent Block won't work. When Target switched back to strip, their rejects dropped from about 8% to less than 1%.

"You can have all the automation in the world, but if you're using the wrong steel, it just nickels and dimes you to death. With strip our machines keep working; we need less supervision, less tool repair. Our trim is small and our percentage of rejects is the smallest we've ever known. We found out we couldn't afford the low cost of sheet. That's why we're back with strip."

The switch is back to strip

Cold rolled sheet steel can be your best buy on a cost per pound basis. Certainly its quality has risen sharply since the war. But, pound cost is only part of the story. If you really need steel tailored to your specific production requirements, cold rolled strip is the answer.

Strip is not sold on an as-rolled basis. What you buy is a specific chemistry, temper, dimension, edge and finish to precisely meet your fabricating and end-use requirements.

American Steel and Wire has over 12,000 mill practices in available strip specifications. Many of your processing steps may actually be eliminated by using cold rolled strip.

Take a hard look at your production line and let our salesmen look with you. Check your rejects, your downtime, your scrap rate. Perhaps you can improve the quality of your product and cut production costs at the same time, with *tailored-to-the-job* cold rolled strip from American Steel and Wire. American Steel and Wire Division, Rockefeller Building, Cleveland 13, Ohio. USS and American are registered trademarks

USS **American Steel and Wire Division of United States Steel**

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal and Iron Division, Fairfield, Ala., Southern Distributors
United States Steel Export Company, New York, Distributors Abroad

GOODYEAR

NEWS! ONLY V-BELTS BY GOODYEAR

to give you sets matched in length to pull together

What's more, Green Seal V-Belts give you—

True dimensional stability for the life of the belt—built in through the use of shrink- and stretch-resistant 3-T Process Cord or airplane-type steel cable.

Mildew-inhibited construction for protection in damp operating conditions.

Widest selection from the most complete V-belt line anywhere.

Ready availability from distributor stocks in every part of the country.

Technical assistance whenever it's needed from a qualified expert, the G.T.M.—Goodyear Technical Man.

For the best buy in V-belts call your Goodyear Distributor. Or write Goodyear, Industrial Products Division, Akron 16, Ohio.

Lots of good things come from GOODYEAR

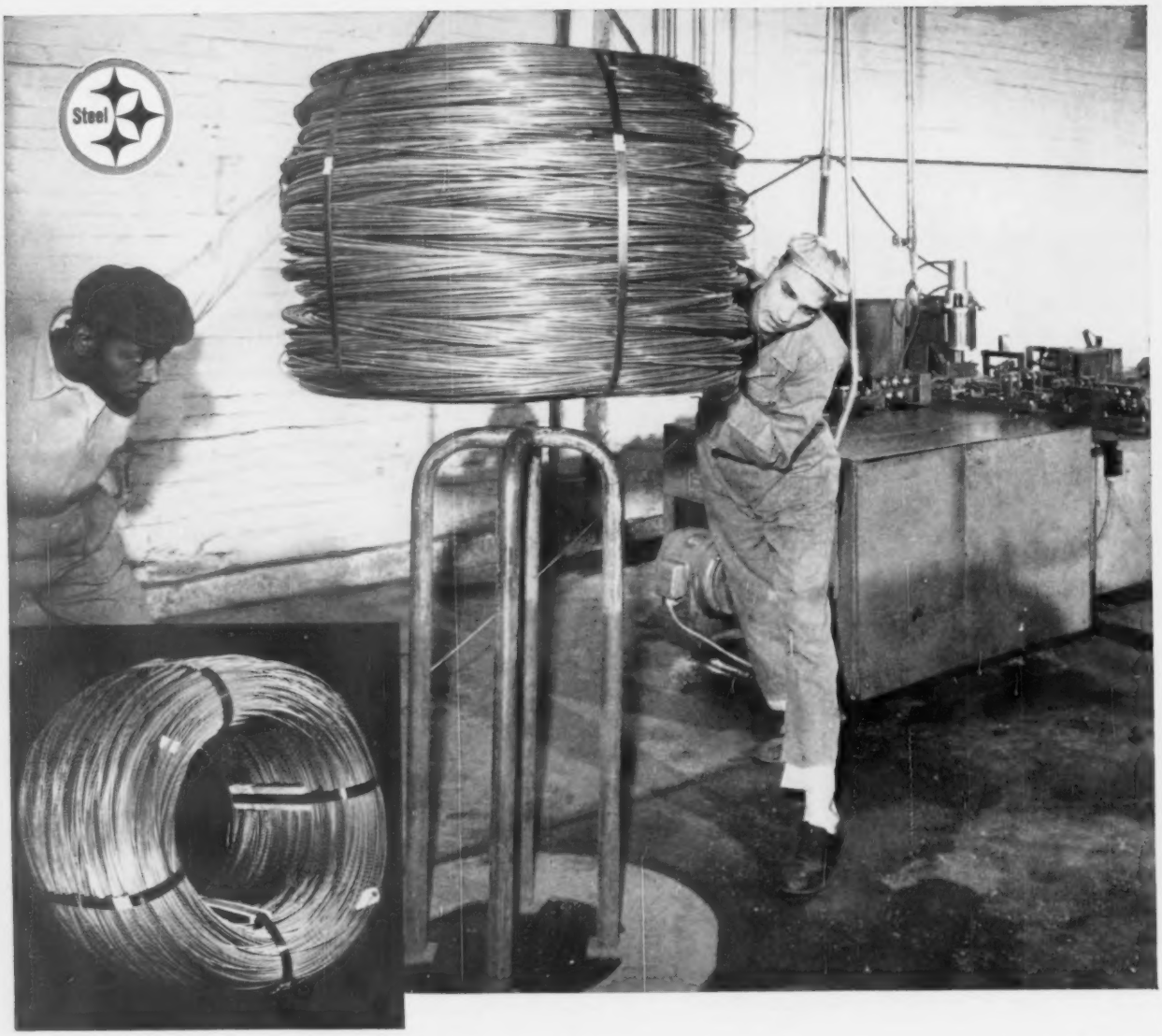
GREEN ✿ SEAL ARE CODED TO 1/32"...

perfectly for longer, more trouble-free service

LENGTH-CODING GREEN SEAL V-BELTS TO 1/32"—NOT JUST 1/10", LIKE MOST BELTS—takes this ultra-precision machine. Only Goodyear has this type equipment, which is set by means of fine tolerance steel templates to insure accuracy. Machine readings are in the actual code numbers used to eliminate errors.

Green Seal—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

YEAR INDUSTRIAL PRODUCTS



CF&I Shaped Coils and Stem-Paks® are Packaged for Your Production

SHAPED COILS

Here's a quote from one satisfied user, the president of a wire fabricating plant:

> "A CF&I salesman examined our operation and suggested that we use CF&I Shaped Coils as opposed to the small coils we had previously used. We now stop our machine only once to start a new coil, instead of 10 times a day. We save nearly 2 hours, and have increased our production by about 20%."

CF&I-Wickwire Shaped Coils contain between 1500 and 2500 lbs. of top quality wire in one continuous length . . . are bundled with four steel straps and, when necessary, wooden supports to insure that the coil is not distorted.

OPERATING ADVANTAGES: Increased production, reduced material-handling costs, less wire scrap and less storage space needed.

DISPOSABLE STEM-PAKS

The experience of a typical user:

> "Up to 75% of our production downtime was caused by using too many small coils. Stem-Paks hold 500 to 1000 pounds of continuous wire. These larger packages keep each machine running as much as 1½ hours longer per day. Stem-Paks allow for free unwinding, without snarling. CF&I Stem-Paks have increased our production 50%."

Stem-Paks hold 500-1000 lbs. of wire in one continuous

length . . . consist of a center core attached to a wooden base mounted on 4″ runners.

AVAILABLE IN: Sizes for 14″, 17″ and 21″ center core (inside diameter).

OPERATING ADVANTAGES: Ease of handling, reduced scrap losses, increased production and less storage space.

Only CF&I offers a total of ten different wire packages. You've just read how two of these packages have increased the production efficiency of leading manufacturers. One or more CF&I-Wickwire Wire packages can do the same for you. Our engineering staff will be happy to study your operation and recommend the type that best meets your requirements. For complete details, write your local CF&I sales office.

THE COLORADO FUEL AND IRON CORPORATION
Denver • Oakland • New York
Sales Offices in Key Cities 8114

Blast cleaning time cut in half breakage eliminated with spinner hanger cabinet

Castings which could not withstand tumbling action are blast cleaned quickly and safely in this versatile Wheelabrator Spinner Hanger Cabinet at Greenlee Bros. & Co.

A demonstration of WHEELABRATOR'S

VITAL VALUES

Although this Wheelabrator Spinner Hanger Cabinet has eliminated the problem of breakage of high tensile gray iron castings which were not suitable for batch mill cleaning, the big savings have come in reduced cleaning time. Blast times have been cut 50% by the efficient exposure of all surfaces to the blast of the two Wheelabrator units. With this versatile Wheelabrator, this foundry now cleans in 6 hours tonnage equal to their former 12-hour output. Abrasive and parts costs also are proportionately lower. Savings like these are vital to operating efficiency and profits—and are the heart of the values you get from Wheelabrator equipment and services. Write for complete information.

VITAL VALUES FOR INDUSTRY

WHEELABRATOR
AIRLESS BLAST EQUIPMENT

WHEELABRATOR CORPORATION, 510 S. Byrkit St., Mishawaka, Indiana. In Canada, WHEELABRATOR CORPORATION OF CANADA, LTD. 1901 Birchmount Rd. P.O. Box 490, Scarborough, Ontario
A subsidiary of Bell Intercontinental Corp.

Roebling Tire Bead Wire: Packaged for Maximum Benefit

The problems eliminated by this unique reel-less core packaging system are manifold. Loads are palletized two cores per pallet and may be stacked two or three high. This, plus the fact that you need not accumulate empty reels means storage space requirements are cut to *less than half*. You do away with all freight and handling costs on reels, the bother and expense of "bookkeeping" returnable reels, and the freezing of money in reel deposits.

This is typical of Roebling's advanced packaging methods—that makes handling Roebling high-quality wire so much easier. For details on this efficient Roebling Tire Bead Wire packaging method, or information on other types of Roebling wire, write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation

Here are tips to help you achieve packing-fluid compatibility!

The efficiency, safety and ultimate cost of a hydraulic system is largely dependent on the compatibility of its packings and fluid medium . . . how well they do or do not work together.

Mineral Oils

The above is frequently overlooked when a plant switches from one type of fluid to another. Take *mineral oils*, for example. Three general types are used in hydraulics, and are classified according to their aniline points: high, medium and low.

If, through error, a high aniline oil is used where low aniline oils are specified, rubber seals in the system would shrink and harden. Conversely, "high aniline" rubber seals will swell and soften in low aniline hydraulic oils. Leakage or equipment failure is the result.

To complicate the picture further, mineral oils made to the same specification by different oil manufacturers, using different crudes, will vary in aniline point to the degree that they may cause synthetic rubber seals to either shrink or swell.

Even among the various types of synthetic rubber used for hydraulic seals, the reactions to mineral oils vary. Buna S and Butyl seals, for example, will disintegrate in mineral oil while Buna N, Neoprene, Viton and Thiokol polymers work very well.

Fire-Resistant Fluids

In many hydraulic systems, *mineral oils* are being replaced by modern, synthetic fluids which eliminate fire hazards without affecting hydraulic efficiency.

Three types of fire-resistant fluids are in wide usage and each type requires a *compatible* packing.

The three basic types of synthetic fluids with *recommended* and *maximum recommended* operating temperatures are shown in the box.

Type	Recommended Temperature	Maximum Recommended Temperature
Phosphate Ester	+130°F.	+180°F.
Water-Glycol	120°	150°
Emulsion water-oil	120°	150°

Phosphate Ester fluids and mineral oils have a directly opposite effect on the same rubber seals. Butyl packings which fail miserably in mineral oils, work beautifully with straight Phosphate Ester while Buna N, which works well in mineral oils, is unsuitable for Phosphate Ester. For this reason, changing a system from mineral oil to Phosphate Ester requires a complete and careful flushing and cleaning *as well as a switch in packing materials*, if elastomer packings are used.

For use with these fluids, homogeneous packings should be of Butyl, fabricated packings of Butyl and duck or asbestos and leather packings should be either Wax or Thiokol impregnated.

Water-Glycol fluids are generally compatible with both Buna N and Butyl seals, and with duck or asbestos. However, they do attack leather fibers. Water-Glycols have a pH of 8.5 to 10.5 and leather fibers start to disintegrate at a pH over 8.0

Because of this pH condition, leather packings are not recommended for use with Water-Glycols. Homogeneous packings should be of Buna N and fabricated packings of either asbestos or duck and Buna N.

Emulsion type fluids react much the same as mineral oils do with rubber and leather. In homogeneous and fabricated packings, use Buna N; in leather, use a filler of wax or Thiokol. Never use Emulsion fluids with Butyl.

A Simple Solution

As complex as the subject appears, packing-fluid compatibility in hydraulic systems can be determined with very little trouble. Houghton Packing-Fluid Compatibility Tables will instantly tell you which packings work best with the various types of fluids in general use.

Better yet, Houghton is in a unique position to give you completely unbiased answers to your hydraulic packing-fluid problems, for **Houghton is the only manufacturer who offers you a complete line of both packings and fluids for industrial hydraulic systems.**

FREE! Packing-Fluid Compatibility Tables

For your copy of Houghton's Packing-Fluid Compatibility Table, or for help on any hydraulic packing or fluid problem, call your Houghton representative or write: E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

Houghton

INDUSTRY'S PARTNER IN PRODUCTION

More parts in more new cars fend off corrosion . . .

GUARDED BY GALVANIZED STEEL

In 1960 the Motor City consumed a massive 218,964 net tons of galvanized steel sheets to fight car corrosion. That's 38% more than was used in 1959 and over 700% more than in 1954.

In the average compact car, for instance, Detroit now uses over 100 pounds of corrosion-resistant galvanized steel sheets. The results are numerous and notable: Car owners are getting greater durability and a sharp drop in maintenance costs and headaches. Manufacturers are getting the cost reductions inherent in galvanized steel's simplified fabricating procedures. Head and tail lamp housings, for instance, formerly required five or six steps when zinc plated or painted after stamping. Now they are moved direct from press to assembly line with their tight zinc coatings completely undamaged by fabrication. The same economies apply to side members, rocker panels, front and rear rails and cross members.

WEIRKOTE,® IN PARTICULAR! Widely used Weirkote is a natural for automotive applications, and the auto industry has been quick to put it to extensive use. To the inherent strength, economy and versatility of steel, Weirkote adds enduring zinc protection that can be worked to the very limits of the steel base without chipping or peeling. This superior product is the end result of years of experience and technical research devoted to coating steel sheets with zinc. Weirkote is manufactured by two National Steel divisions, Weirton Steel and Midwest Steel. Write Weirton Steel Company, Weirton, West Virginia, for further details.

MIDWEST STEEL
Portage, Indiana

WEIRTON STEEL
Weirton, West Virginia

Divisions of
NATIONAL STEEL CORPORATION

R/M POLY-V® DRIVE

Poly-V Drive on giant Erie Foundry 2500 ton automated press

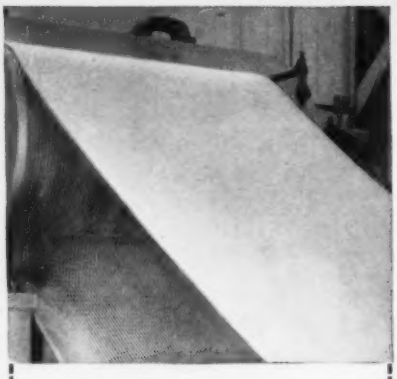
Rugged POLY-V® DRIVE Delivers More Power in Less Space... with More Reliability

R/M Poly-V Drive employs a *single*, endless V-ribbed belt across full width of sheaves with mating grooves. All parts of the belt work *together* to increase drive capacity—deliver more horsepower per inch of drive width than ever possible with conventional multiple belt drives. Only Poly-V* offers these exclusive advantages:

- **Simplicity**—just *two* belt cross sections meet *every* heavy duty requirement
- **Reliability**—less maintenance, less take-ups . . . less wear on belts and sheaves
- **No Matching**—not an assembly of V-belts . . . single unit belt eliminates length matching problems.
- **Better Performance**—maintains groove shape, complete contact-pressure, constant pitch and speed ratios . . . runs smoother, cooler under *all* drive loads.

WHEN YOU CHANGE DRIVES . . . CONVERT TO POLY-V *AND BE SURE!*

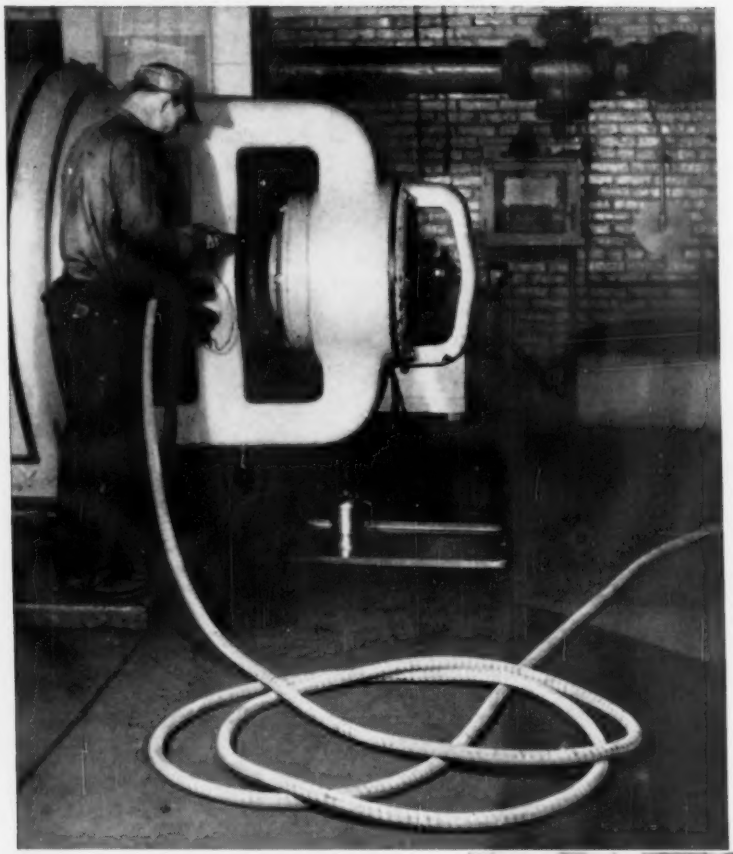
*Patented



MORE USE PER DOLLAR

Change-over to R/M Poly-V Drive now delivers "power plus" on this rugged hot saw drive at one of the country's largest steel mills. Ask an R/M distributor about Poly-V for *your* installations . . . or write for new Bulletin M141.

RAYBESTOS-MANHATTAN, INC.
MANHATTAN RUBBER DIVISION • PASSAIC, N. J.
ENGINEERED RUBBER PRODUCTS



Super-Strong HOMOFLEX Air Hose is Flexible as a Rope

Easiest handling hose made for use with air tools. Homoflex is strong, flexible . . . yet *weighs less* than any other hose for equal working pressure. Homoflex is also made in types for water, other fluids and gases.

- **Super-Strong**—assures longer, trouble-free service life
- **Precision Built**—with super-strength low-stretch cords
- **Mandrel-Made**—no pre-set twist
- **Kinkless**—coils and uncoils freely in any direction
- **Homogeneous Construction**—provides inseparable tube-to-cover bond
- **Safer, Easier To Couple**—inside and outside diameters are uniform

Let an R/M distributor show you the advantages of Homoflex and other R/M hose constructions for *your* service requirements. Write for Catalog M5.

Deeper Troughing RAY-MAN Conveyor Belt Trains Easier—Hauls More

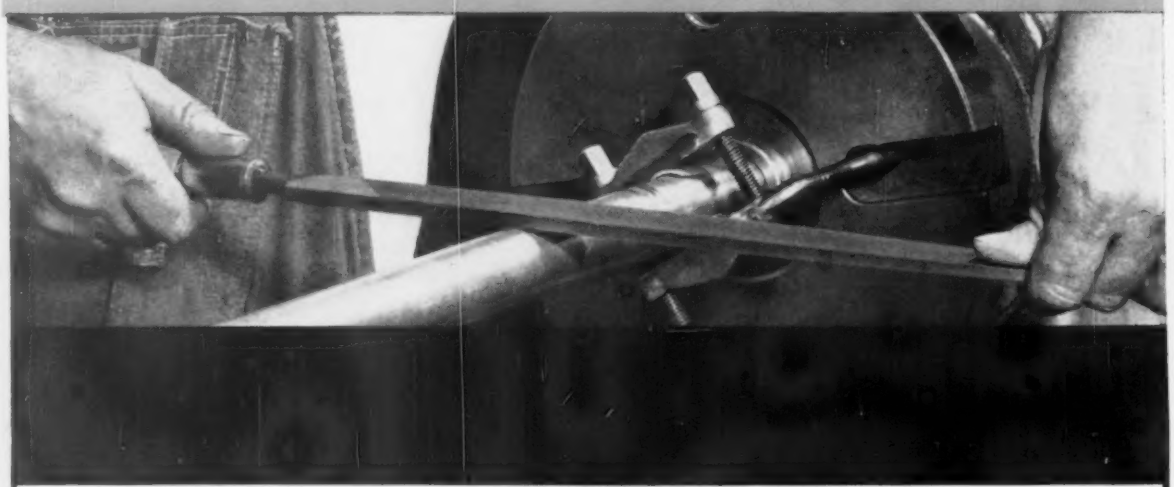
Ray-Man has the flexibility and troughability to haul fuller loads—even with small pulleys, reverse bends, snub or take-up pulleys. Compare its exclusive advantages:

- **High Cover-Adhesion All Around**—top, bottom, and edges
- **Full Cover Thickness Used**—no breaker needed—longer cover life
- **Splices Last Longer**—hold fasteners better
- **More Troughable and Trainable**—highly flexible, double compensated
- **Ideal for 45° Idlers**—guaranteed against separation at idler hinge line
- **Operates on Smaller Pulleys**
- **Impact Cushioned**—resists ripping

R/M's exclusive "XDC" Cover gives *extra* protection against wear and tear. Talk to your R/M distributor . . . or write for Bulletin M302.

RM134

Everything's shop shape...



Smoothing, trimming and shaping--the prime functions of a file are best done by the finest files--Nicholson or Black Diamond.

There's a file for every shape, for every material, every degree of coarseness. And every single file bearing the Nicholson or Black Diamond name is a supreme example of modern precision manufacturing--from the delicate needle file to the largest mill file.

Keep everything shop shape with a full selection of the finest files for your particular needs. Your Nicholson or Black Diamond Distributor* can suggest the file types you need.

*Industrial Distributors provide the finest goods and services in the least possible time. Our products are sold exclusively through them.

NICHOLSON

NICHOLSON FILE COMPANY, PROVIDENCE 1, RHODE ISLAND • FILES • ROTARY BURS
HACKSAW AND BAND SAW BLADES • GROUND FLAT STOCK • INDUSTRIAL HAMMERS

THE FIRST 1962 MODEL AUTO PRODUCTION will be by Studebaker on August 7. The company will be followed a week later by Buick, Oldsmobile, Pontiac, Cadillac, Rambler and some Chrysler Corp. makes. Auto inventories now stand below 900,000 units as a result of changeovers. This is the first time since last October that inventories have gone below 900,000.

THE NEW LAW which makes soft drink containers carry a list of ingredients may help put more soda in cans. Few bottles now use paper labels. New sets of molds will be needed by bottlers to get lists on bottles. Some companies are trying to put lists on caps. Canmakers face only inexpensive changes on lithographing plates.

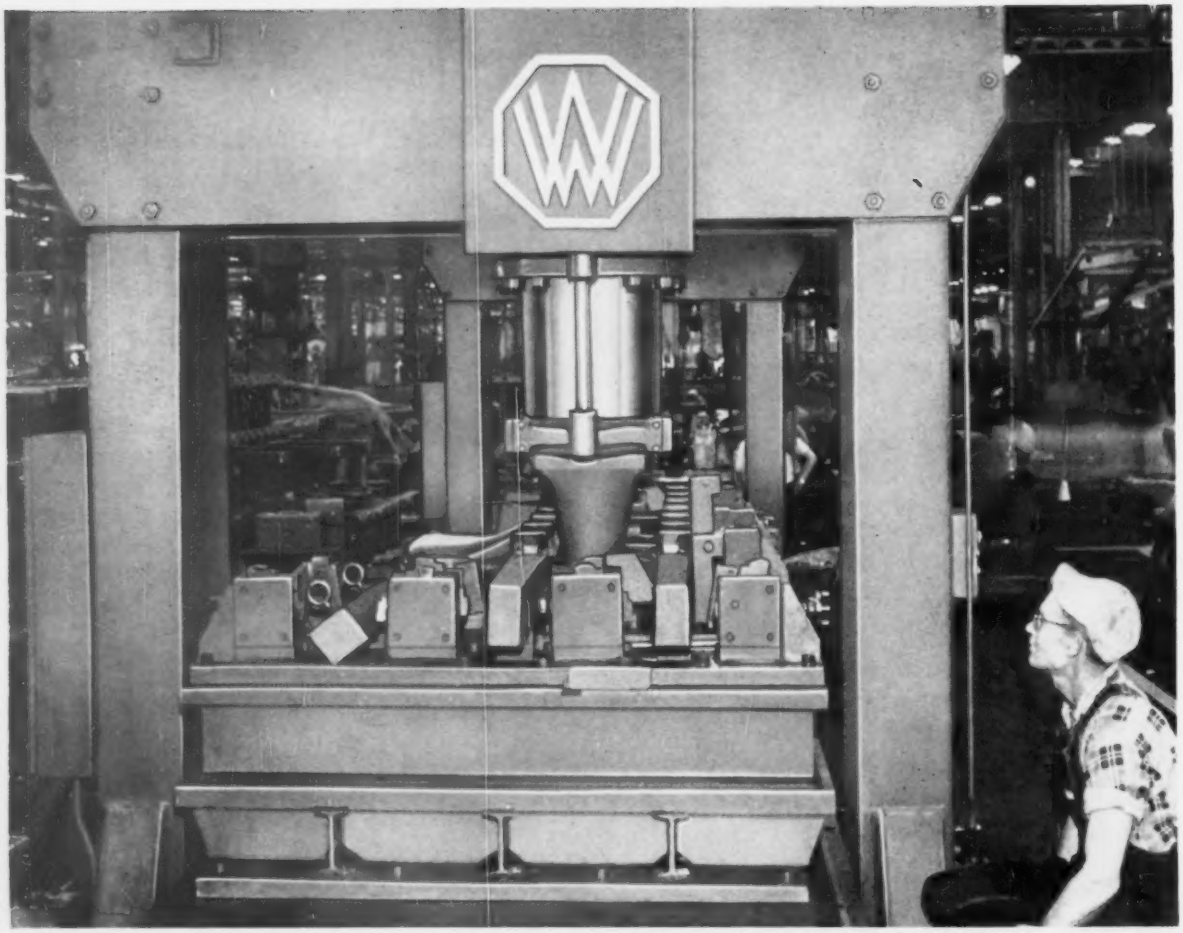
SMALL COMPANIES ARE BECOMING BIGGER CUSTOMERS. A record-breaking number of government contracts were awarded by the Small Business Administration in the first half of the year. Small company contracts totaled 22,361. This is 69 pct greater than the number awarded for the same period in 1960. Dollar value of the contracts totaled almost $750 million.

HOME REMODELING has grown to such a large and important market that the National Assn. of Home Builders has started a new remodeling department. This is the result of a survey by the group that shows one-third of builder-members in remodeling work.

OWNERSHIP OF MAJOR APPLIANCES is noted in a Census Bureau report based on the 1960 census of housing. Washing machines are owned by 62 pct of households. Almost one in ten households own clothes dryers, and one in six own home food freezers.

ELECTRONIC REMOTE CONTROL EQUIPMENT is heading for a $50 million annual market by 1965. This is the prediction based on a special marketing survey by Moore Associates, Inc., a California instrument maker. The equipment will be needed for pipelines, offshore and leased oil wells and refinery processes. Pipelines will take $35 million of the total equipment, says the survey.

THE INDEX OF THE AMERICAN GEAR MANUFACTURERS ASSN. shows an 11.1 pct increase in June over May. The June index was 220.0 (1947-49 = 100) for new bookings. This is below the 1960 average of 235.5. June shipments index hit 245.4, up from 239.1 in May.



Picture courtesy Caterpillar Tractor Co.

200 Tons pressure -- pinpointed -- to straighten massive parts

To accurately straighten a variety of massive parts used in the manufacture of heavy earth moving equipment.

Two 72" x 200" Williams-White Travelling Head Hydraulic Presses with 54" ram stroke are employed by Caterpillar Tractor Co. to accomplish these straightening operations, efficiently and accurately. The mobility of the ram, with its 144" longitudinal and 48" lateral travel over the table, allows the positioning of parts on the table by use of a crane or other suitable means. After proper positioning, the full 200 tons pressure of the ram can be "pinpointed" over the work for precision straightening.

The strength and mobility of Williams-White Presses, utilizing the tooling skill of Caterpillar engineers, straighten a variety of heavy parts easily and accurately. For details on Williams-White Travelling Head Presses ask for free bulletin or write, outlining your straightening or bending problems.

102th year

WILLIAMS-WHITE & CO 600 Third Avenue, Moline, Ill.

the measure of Performance Reliability for more than a century

BULLDOZERS • PRESSES • SHEARS • BENDERS • PUNCHES • HAMMERS

3M61

Top Service Needed to Market New, Modern Machinery

Service staffs move to the front as machinery becomes more and more complex. New equipment demands attention of specialists.
By T. M. Rohan

■ "When I started in maintenance work 35 years ago, the employment office always sent us the biggest and dumbest guys they could find. They usually made the best maintenance men because they could really swing the old sledgehammer.

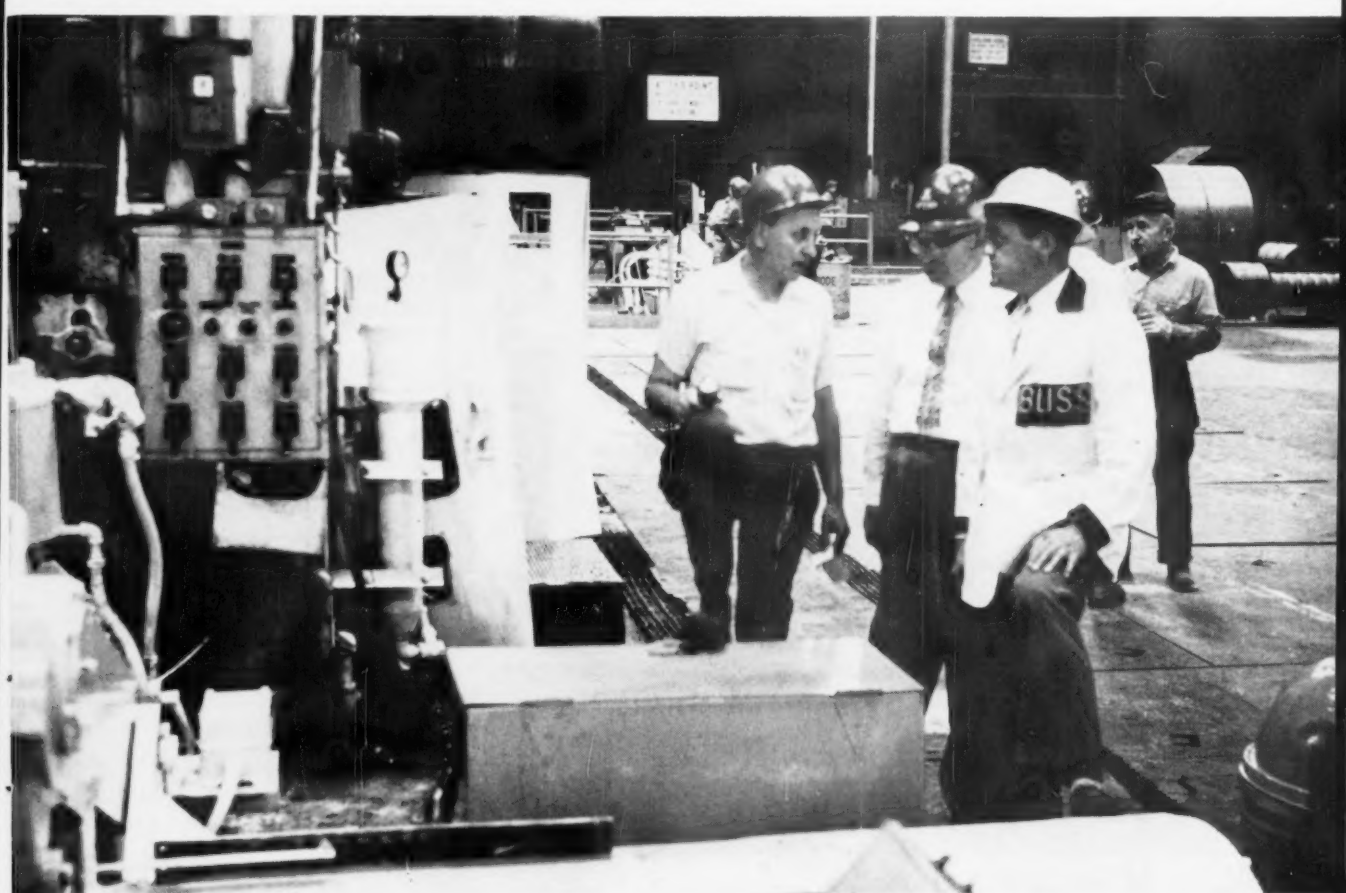
"Now we have lubrication engineers, electronic maintenance engineers, seminars, night school maintenance classes, and discussion groups. The maintenance man of today may still be big. But he'd better not be dumb."

This, according to Marshall Davies, maintenance superintendent, Jones & Laughlin Steel Corp., Cleveland works, sums up the maintenance transition that has taken place in steel mills. And it's possibly even more complicated in other metalworking plants.

Competition Strains—In the middle of this trend are machinery builders. With today's loose market, delivery promises made in the heat of competition must be met. Otherwise the builder has a handicap going after the next order.

Factory installation men must arrive with a machine. They have to debug it and demonstrate its op-

*Left to right, John Kalman, maintenance foreman, finishing division; Marshall Davies, superintendant of maintenance, Cleveland Works; Arthur Loesch, E. W. Bliss service representative.



SERVICE HUDDLE: Supplier service specialist works with plant maintenance men at J & L's Cleveland Works.*

When Machines Break Down . . How to Delay Service

Repair and maintenance experts say that when one of their machines breaks down or is damaged in a customer plant, the biggest problem is finding out what is wrong.

The plant manager calls his purchasing agent (who knows where to find the machinery salesman or company) and says to get a man out quick, the machine is down, production is stopped and there are umpteen men sitting around or on the way home.

The repair experts say that in 9 out of 10 cases, if they can talk on the phone to the machine operator or maintenance man (who invariably is the last one consulted) they can diagnose the trouble, get repairs started, find out what parts to bring along and generally save hours or days. A conference call or one from within sight of the disabled machine is far better than putting all the emphasis on "get a man out right away." And quite a few progressive companies have set up specific procedures in this area.

eration and maintenance. And they must be sure it works as promised. So builders are hurriedly upgrading their service and maintenance crews to meet the competitive challenge.

Today's service man is demonstrating to customers how to service newer, faster, and far more complex machinery than in the past. Much of it is automated, electronically controlled, and often completely unfamiliar to the buyer.

Schoolmasters—Machinery builders are becoming schoolmaster-hosts to streams of operators and maintenance men sent in by customers. When out on a job, many service and installation men conduct seminars on maintenance.

Often, these seminars are recorded and later transcribed for circulation. And many times maintenance men will confer with design engineers after a trip to change troublesome parts.

These service men are also not above competitive spying. And occasionally they are even asked to repair machinery from another builder. They even act as low-pressure salesmen, from time to time, making calls with regular salesmen.

SERVICE INSTRUCTION: More than 400 customer service people and operators have been trained for Kearney & Trecker's new Milwaukee-matic.

Long Jobs — Some companies keep men on a job site for months, if necessary, to locate trouble. One machine maker had a service man on a job for three months before the problem was located—in another piece of machinery. On overseas installations of steel mills, cement plants, or other such projects, service personnel can be on the job site for years. Often they work with primitive equipment.

There are some new twists in the industry reflecting the growing complexity of the work of the maintenance man.

One such twist came from McKay Machine Co., Youngstown, O., last year. The service manager at McKay also was made chief inspector. Therefore, whatever his men might overlook in the shop comes back to them from the field.

Lee Wilson Co. of Cleveland has so many new annealing jobs underway in Youngstown that a service man is permanently moving his family there after months of frequent commuting.

Overnight Hit — Kearney & Trecker Co., Milwaukee, has trained over 400 customer service people and operators at the home plant of its new Milwaukee-Matic. And a new block diagram trouble-shooting book for tracing and isolating electronic gremlins has become an overnight hit with users.

Some machine tool builders are taking advantage of slow production schedules now by advertising open shop time for machine overhauls. While no bargains are offered, it's pointed out that service will be far faster than when things pick up.

Beardsley & Piper Div. of Pettibone Mulliken Corp. conducts service inspections gratis every two months. Inspectors give warning of needed maintenance for the plant's own crew to handle.

No Sales Call — Yoder Co., Cleveland, uses a program where service men working at one customer's plant in a given area will

also visit others nearby. He offers to check things over. It's definitely not a sales call.

Changes have also come at the buyer level. Warner & Swasey Corp.'s Cleveland plant, for example, has set up a new shop labor grade. It's known as "electronic maintenance man" and it is one step above electrical maintenance. These men are sent to factory schools. And in-plant training is being set up with consultants and colleges.

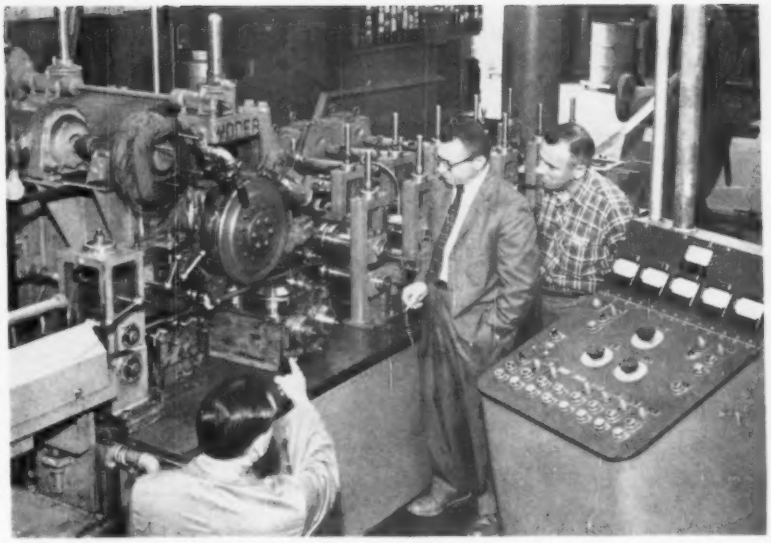
Warner & Swasey maintenance superintendent Richard Knap says similar special grades may soon be necessary for mechanics and hydraulics. A drawback now is that prospective schools are long on theory and principles, but understandably short on specific equipment.

Jones & Laughlin's Mr. Davies has men attending night school, visiting vendor plants, holding seminars, and generally upgrading the staff. Electronics specialists are being developed from electrical maintenance men.

A Must—All production equipment must have top preventive maintenance programs. A breakdown could totally stop steel production at a mill. And downtime costs on highly-automated equipment have skyrocketed.

Electronic control—punched or magnetic tape, punched cards, or other methods—is rapidly becoming the bogeyman of maintenance crews. In the words of one service boss: "We've all been caught with our pants down on electronic maintenance. With the new controls, it takes an expert to even find the problem and determine what repairman is needed. Simply isolating the problem is becoming more complicated by the day."

Many plant managers find that "discount" buying can have problems. Immediately after a sale, builders will supply all the factory experts and help needed. But when things go wrong later, the difference starts showing. Cost of service must come from somewhere. So often, the "discount" buy comes back to haunt the user.



IN THE FIELD: The men responsible for operating tube mill look on as Yoder Co. representative explains unit at Steel Case, Inc. Grand Rapids.*

*George Holub, Yoder representative, kneeling; John Stegmier, machine room superintendent, and William Patterson, tube mill operator.

Part of Price—"Cost of installation and service used to be such a small fraction of a machine's price that it didn't even figure into the sale," says A. J. Wardle, McKay president. "Now, we estimate it as a part of the sales price. It can be separated.

"Because of the higher cost, generally, of service, there is now increased emphasis on quality control and longer testing."

Mr. Wardle also notes: "Our service people must be good engineers, too. Our machines fit into production lines with other parts from many other companies. So we can't set up a whole line in our own shop for testing."

Company service men are often salesmen-by-request, simply because they are on the spot. But a service man bucking for salesman soon hits a stone wall with customers.

Service Men on the Job . . . Union Rules: Another Obstacle

One of the bugaboos of visiting factory men is union shop rules. Service men are supposed to supervise work rather than do it themselves. But many do it anyway while a union man stands by and observes. Phoney union cards have been used to get the job done.

Service men going out on a job in strong union plants try to get there early to make up the time inevitably lost waiting for the correct labor gang to show up for their part of the work. Changing a roll on a forming mill involves:

1) Maintenance crew removes tooling;

2) Materials handling moves parts to the repair area or shop;

3) Craftsmen repair part;

4) Materials handling returns it;

5) Maintenance re-installs tooling;

6) Set-up man puts back in use.

Wider Galvanized on the Rolls

Armco Steel Corp. is running a new 72-in. continuous zinc-coating line, widest ever built.

The company is betting that wide galvanized sheet will be a hot product.

▪ Few companies now fabricate wide galvanized sheet. But Armco Steel Corp. feels widths up to 72 in. will soon become a hot product.

At its Middletown, O., home plant last week, Armco unveiled a new $8.5 million hot dip galvanizing line. It will turn out galvanized steel to that width, same as its cold-roll mill, making it the world's widest.

COOLED: After zinc coating.

Auto Objective—Top market at the moment is the auto industry. It is using more and more galvanized and aluminum coated steel to cut corrosion.

The new 72-in. wide mill is obviously aimed at the day when cars will have galvanized floorboards and other large underbody parts.

But Armco's president, Logan Johnston, has his eye on additional markets.

Hard Sell—"When we first came out with the original Sendzimir continuous galvanized sheet in the 30's, we had a tough time selling it outside the roofing and siding field," he says. "But once it took hold and users found they could shape and draw it, it became a manufacturer's sheet. And this is now, by far, the biggest part of our business.

"This 72-in. wide sheet, in the same way, offers manufacturers an advantage in fewer laps and welds, more wrap-around construction and lower cost. Products can be designed to capitalize on this. We will also be applying multiple coatings at the mill which will hold down the costs, the same as multiple rollings," says Mr. Johnston.

Bethlehem Line—"After discussions with us, we were flattered to learn Bethlehem Steel Corp. decided its new galvanizing line at Lackawanna, N. Y., will also be a 72-in. mill where a 60-in. width was originally planned."

"Industry shipments, too, show that last year, despite a generally slow steel year, the industry shipped 3 million tons of coated products. This year, I think, it will be even better—about 3.3 million. Zinc coated tonnage has approximately doubled since the early post war years, while steel as a whole has grown 66 pct."

Testing Ground — The line at Armco will serve as a good testing ground for the new wide sheet.

While almost all major sheet producers have galvanizing plants now, the vast bulk of the market has been in 36- to 48-in. wide, 18- and 20-gage sheet. And a recent survey by one producer indicates very little usage over 53 in. at present.

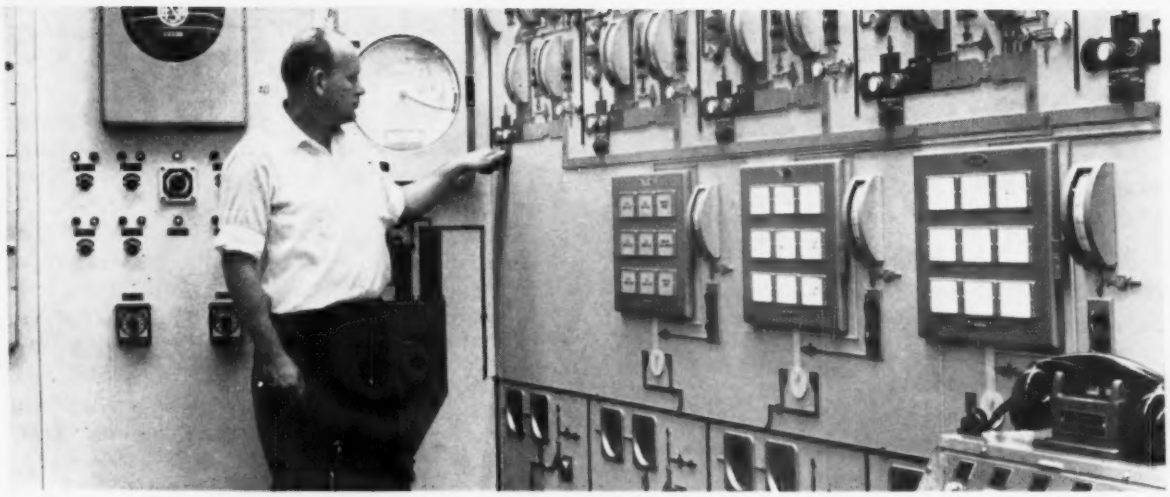
Armco has had only one order for the maximum 72-in. width so far, though it has been in pilot production several weeks and is now going 20 turns. Its previous maximum widths have been 52 in. at Middletown and 60 in. at the Ashland, Ky. mill.

Still Growing — But auto usage of galvanized, which took 218,964 tons last year, is still growing.

Newest use is for rocker panels on some cars where paint is applied over the surface, and inner decks on some General Motors Corp. cars. Usage per car is estimated at 100 lbs for a unitized compact this year.

Armco's new line will turn out about 30 tons per hour. It moves into production at a time when deliveries are out to September. It will coat 300 fpm and coating weight is checked with a Strontium 90 gauge.

The new mill has a controlled-atmosphere furnace ahead which insures top cleanliness for best adherence in zinc pots. Sheet comes out somewhat stiff and hard but can be given another anneal for drawing quality. Spangle is also somewhat large. But it can be controlled by a following temper roll and, if necessary, can be almost completely eliminated.



DUST CONTROLLER: Eight electrostatic precipitators are regulated by J&L from this one control room.

Smoke Control Ups Mill Costs

Jones & Laughlin is proud of its new air cleaning system which can cut dust emission nearly 99 pct.

But its high cost is typical of the heavy investment needed to meet smoke control laws.

By G. J. McManus

■ Ten million dollars went up in smoke control last week when Jones & L aughlin Steel Corp. turned on the new air cleaning system at its Pittsburgh openhearth shop.

Serving 11 furnaces and equipped with 8 electrostatic precipitators, the system is designed to reduce dust emission nearly 99 pct. It is expected to do better than is required by Allegheny County's tough new air pollution code.

Two-Fifths Controlled — The J&L startup gives Pittsburgh smoke control for 40 pct of the area's steelmaking capacity. It puts producers six months ahead of schedule in a joint program that calls for 100 pct compliance with the county code by 1971.

The move also pointed up the size of steel's smoke problem. It cost Jones & Laughlin almost $1 million a furnace to provide the precipitators and waste heat boilers at Pittsburgh. This is only part of the mill's cleanup program. Basic oxygen vessels at Aliquippa, Pa., have been equipped with electrostatic units. A new sinter plant at Aliquippa has smoke control; scrubbers are going on blast furnaces there.

At Cleveland, J&L is putting control equipment on all iron and steelmaking facilities. The new basic oxygen vessels will have precipitators; three large openhearths will be tied into this system.

Civic Responsibility—The basic reason for this costly construction is explained by C. M. Beeghly, J&L president.

"We believe that our Pittsburgh works, situated as it is in the heart of the city, is and must be a leader in developing techniques to minimize air pollution," says Mr. Beeghly.

For the mills, smoke control is strictly a matter of civic responsibility or civic pressure. Blast furnace dust can be reclaimed but there is no return from openhearth precipitator systems. And it is the openhearths that have become the big storm centers.

Oxygen Contributes — By using oxygen roof lances, the mills have gotten a sharp increase in openhearth reactions. However, oxygen injections kick up almost twice as much dust as does conventional practice. The smoke looks even denser because there are more fine particles. And fuel injections make things even worse.

It is pretty generally accepted that smoke control will have to be provided ultimately by all mills. Koppers Co., Inc., which supplied precipitators for the J&L installations, has received inquiries from eight mills.

Cost Analysis—Some feel this condition will speed the swing to oxygen steelmaking. Working in favor of this swing is the fact that smoke control is relatively cheap with the vessels. It costs about $3 million to provide cleaning units for a large oxygen steelmaking plant. For the same steel capacity with small openhearths, smoke control costs $10 million.

Old Auto Plant Switches to Wire

After deciding to make insulated wire, Reynolds Metals Co. bought the former Ford assembly plant at Chester, Pa.

Despite need for extensive alterations, the purchase has many advantages for Reynolds.
By P. J. Cathey

▪ Last spring Reynolds Metals Co. bought Ford Motor Co.'s former auto plant at Chester, Pa., and is revamping it to make insulated aluminum and copper wire and cable.

Before the plant goes into operation next year a lot of changes must be made.

Floors, Pits and Roof—Some of them include: In parts of the building, concrete flooring will be ripped up and the area reinforced to support wiremaking equipment.

In other areas deep pits, down to 14 ft, are being dug out to house large vacuum impregnating tanks. Because the water table at Chester is high, averaging 4½ ft below the surface, these pits have to be pumped out and then sealed off against further water action.

Where enamel drying ovens are going in, Reynolds must raise the existing 22 ft ceiling to a total height of 42 ft.

Why Buy?—Forced to make all these changes, why did Reynolds buy the plant? The answer boils down to two reasons: Adaptability and price.

Making insulated wire and cable is a new venture for Reynolds. The company has been manufacturing non-insulated aluminum wire and cable at Lister Hill, Ala.

When the John A. Roebling Sons Div. of Colorado Fuel and Iron Corp. discontinued making insulated wire at its Trenton, N. J., plant, Reynolds bought the equipment, employed some former Roebling personnel, and arranged to move the men and machines.

Why Chester? — The next step was locating a new manufacturing site. Reynolds preferred to buy an existing plant. By sidestepping building time, production and marketing of products would be speeded.

The Chester plant, discontinued by Ford in April, has several important advantages. It was a well-built installation, located within the major markets for utility-industry wire and cable. The plant's floor space, 650,000 sq ft, was just about the size Reynolds wanted. There was sufficient room for expansion as needed. The location was close to major transportation by truck, rail, or water. There was a good labor supply. And the purchase price for the entire plant was $2.2 million.

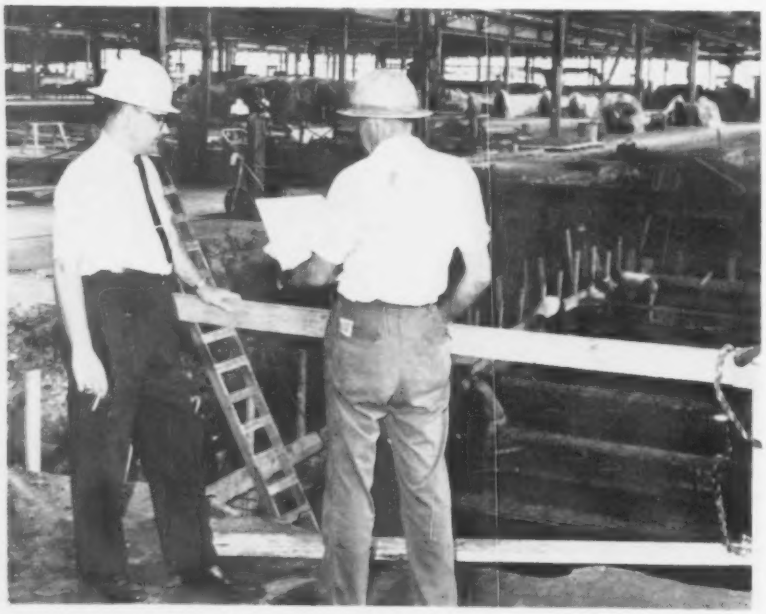
Even before Ford moved out, Reynolds engineers were surveying facilities and planning where to install equipment. By July truckloads of wiremaking equipment were being brought in.

Water Seepage Problem—One of the toughest jobs is beating the water seepage problem. As pits are dug to house impregnating tanks and other equipment, bearing pile is driven down to refusal point for foundation support. This sets the limit for other piling, by indicating the limit where piling will anchor in soil.

Pumping operations continue until the bottom concrete slab is poured. With piling forming the outside wall of the pit, concrete foundations are then poured.

Greater Support—At other locations, such as the underwater testing pits, structural H beam bearing piles are driven into the soil in the same way. Because of the low ceiling the beams can only be handled in 10 ft or 12 ft lengths. After one beam is driven down, another is splice welded to it, and the process continues.

The floor thickness throughout the plant area is 6 in. This must be reinforced in some areas to support wiredrawing equipment. After old flooring is ripped out, new foundations up to 24 in. thick are poured.



DIG, THEN POUR: To make way for wire solution tanks at former auto assembly plant, Reynolds engineers had to solve many problems. They dug pits, reinforced them, and then poured in thick foundations.

ECM: Over a Wall or Through the Door?

■ The decision of the British government to apply for membership in the European Common Market could seriously affect the metalworking industry of the United States.

It is the last "All aboard!" for America's No. 1 manufacturing industry.

It is a warning which could be costly to those who need to heed it and fail to do so.

What does it mean to metalworking management? Well, that depends on where you stand vis-a-vis the United Kingdom and the ECM.

The Facts — To outline the present set-up in 163 words: The six nations of the European Economic Community (Belgium, France, Italy, Luxembourg, Netherlands and West Germany, better known as the ECM) signed the Treaty of Rome in 1957 to achieve an economic and quasi-political union. They planned to wipe out all tariffs among the Inner Six by 1969—and to set up a common external tariff wall around them. To date they have cut tariffs on industrial products by about 35 pct and are well ahead of their tariff-cutting timetable.

The Treaty of Rome scared the British, and others now in the "Outer Seven," into forming the European Free Trade Association (Austria, Denmark, Norway, Portugal, Sweden, Switzerland and the United Kingdom). The Seven began to cut tariffs among themselves in keeping with the Six. This was designed to do two things: (1) Partly offset the trade advantages gained by the Six; and (2) prevent too great a disparity in tariffs between the two groups—to provide a bridge in case the Seven should ever decide to join the Six.

That's the background. Now the Seven see the need — economically—to join the Six.

MACMILLAN: At the door

The political-union angle is more involved. It could mean some loss of sovereignty, which bothers the British, the Scandinavians, and the Swiss more than it did the Western Europeans.

Work to Be Done—Application does not mean admittance. There'll be long negotiations; the Commonwealth problem is very real; the Swiss are extraordinarily independent; DeGaulle doesn't like the idea of playing second fiddle to anyone—much less an Englishman.

But businessmen must make business decisions on what will probably happen. If one could deal only in certainties he'd be overpaid at $10,000 a year.

It Can Happen — The Outer Seven will probably join the Inner Six. Last year, U. S. metalworking industry exports to the UK and the Common Market countries alone were well over half a billion dollars.

Picture 300 million people with no more internal tariffs than the 50 U. S. states have—but with a common external tariff.

Oh, we'll negotiate some tariff concessions. And we'll invent. Good research and development work will hold some markets and capture new one. A united Europe is a better bulwark against Communism. And for some products it will be a better customer.

Economic Facts — For the thousands of U. S. metalworking companies which have tied into the UK or the Common Market, the merger would be wonderful. It would prove, incidentally, that such moves do not "export jobs." Because when, as, or if this comes about, the facts of economic life will be obvious.

Does the phrase "the facts of economic life" seem like an effort to gloss over some hazy details? No, it means that it will be pretty tough to build a piece of machinery in Cincinnati and sell it in Cairo in flat competition with a chap from Coventry.

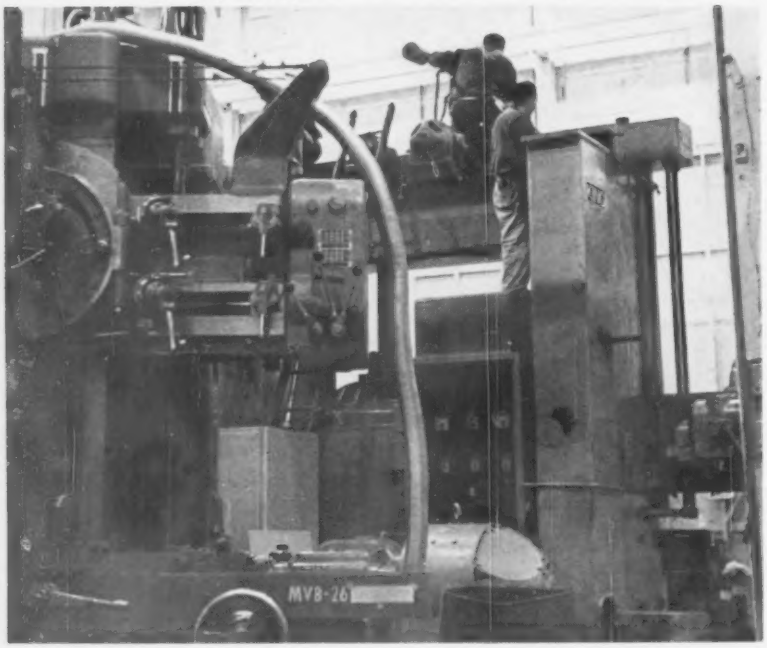
Overall Effects — But it also means that given comparable terms, a good many overseas buyers will still prefer U. S. machine tools — unless German builders catch up with domestic demand and offer good engineering in a hefty machine at 30 to 40 pct below U. S. prices.

The outlook, in short, is that while the overall effect would probably be good for the U. S. and certainly for the Free World, there are bound to be some U. S. dislocations.

For those who have not signed licenses, set up subsidiaries of joint-ventures in Europe—this is probably the last call. Is it too late? No, people were saying that a year or more ago—but scores of companies have since "moved-over."

But it soon may be too late. It is easier to go through a doorway than it is to scale a wall.— **G. F. Sullivan.**

New Facility Expands Brush Capacity



MORE CAPACITY: Workers prepare a vertical boring mill at the new Cleveland fabricating plant of Brush Beryllium Co. The plant, which increases metal fabricating capacity by 50 pct, went into operation in July.

Military Orders More AM Mighty Mites

American Motors Corp. will continue production of the ¼-ton utility truck called Mighty Mite. The most recent order for the "truck" came from the Detroit Ordnance District and is valued at more than $3.6 million.

The contract completes funding for 1000 vehicles ordered on March 1, 1961. It also provides for an additional 232 trucks. Total dollar value of the contract is nearly $7 million.

Under other contracts, American Motors has already delivered 1250 Mighty Mites to the Fleet Marine Services. They're being used in the U. S. and overseas.

Vulcan to Build Detroit Area Plant

Vulcan Mold and Iron Co., Latrobe, Pa., will be building a $7.5 million ingot mold manufacturing plant near Detroit.

The company has officially announced the plans calling for construction of the plant in Trenton, Mich. Other facilities are located in Latrobe and Lansing, Ill.

Vulcan president, James Underwood, says: "We selected the Trenton site because Michigan is now one of the recognized major steel-producing areas in the country. We intend to supply the industry in the Detroit area with quality ingot molds."

The 35-acre site will include a main plant building with an estimated 170,000 sq ft of production floor space. There will also be storage and raw materials buildings, locker facilities and an office building.

The plant is designed to produce approximately 100,000 tons of ingot molds per year.

Steel Plate Now Ready for Space

Steel plate may make some new advances in space. According to Lukens Steel Co., new technological developments mean solid-fuel booster engines will be capped with ultra-high-strength steel.

To make the caps, Lukens is spinning steel into dome-shaped heads. The heads are 10-ft in diameter, 30-in. deep, and weigh 3200 lb. Engineers at the steel company consider the forming of such highly specialized steel to rigid requirements on a production basis a vital step in "reducing the space age gap."

The company notes: "It means the heads and plates of this material are now readily available for hardware of the gigantic dimensions necessary for space programs blueprinted for two or three years hence."

The first of the heads are now being delivered to Excelco Developments, Inc., Silver Creek, N. Y.

Shelter Program Moves Ahead

The Defense Dept.'s new civil defense shelter program would mean a boost in sales for builders of shelters.

The $207 million civil defense plan—including $169 million for shelter programs—is getting support in Congress. In fact, some Congressmen say the program does not provide enough shelter space. They are seeking to increase the request.

Shelters of the following design already have government approval: Steel fabricated shelters; reinforced concrete shelters; corrugated metal shelters; prefabricated aluminum shelters; steel tank type shelters; metal panel (sand filled) shelters; and, prefabricated steel type shelters that can be bolted together.

Shelters are a first step in plans to protect 50 million Americans in the event of nuclear attack.

The program stresses identification, marking and stocking of fallout shelters in government and private office buildings, factories schools and churches. It also includes funds to determine the need for new shelters. Federal aid and tax incentives for home shelters are being discussed.

INDUSTRIAL BRIEFS

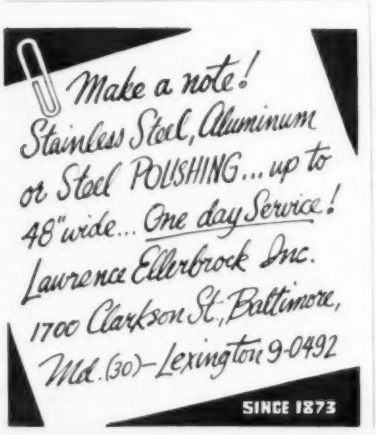
Record Roll—At Reynolds Metals Co. alloys plant at Sheffield, Ala., a record 1.3 million lb of aluminum can sheet was rolled in one eight-hour shift. The record can stock run was on the new aluminum rolling hot line. The 48-in. wide finishing equipment operates at speeds up to 600 fpm. It trims, flattens, shears, classifies, cleans and piles the sheets automatically.

Coiling Up—Cenco Instruments Corp., Chicago, has acquired Instru-Coil Co., Cincinnati, maker of precision coils and springs.

Further Tests — Riehle Testing Machines Div., American Machine & Metals, Inc., has acquired two new testing machine lines. They include Steel City Testing Machines, Inc., of Detroit, and the hardness tester business of Torsion Balance Co., Clifton, N. J.

Beryllium Buy — Loral Electronics Corp., New York, has acquired American Beryllium Co., Inc., and its subsidiaries, United States Beryllium Corp. and Visioneering Co. Loral's new subsidiaries are independent beryllium fabricators.

Another Line—Tilo Roofing Co., Inc., Stratford, Conn., is merging with Reynolds Metals Co. Tilo makes and installs asphalt and asbestos-cement siding and asphalt roofing materials.



Tube Merger — Grieder Industries, Inc., has merged into Pines Engineering Co., Inc. All tube cutting machinery operations of Grieder at Bowling Green, O., have been moved to the Pines plant at Aurora, Ill.

Now Extruding — Regal Extrusion Corp. has opened a new $150,000 aluminum extrusion plant at Miami, Fla. It will produce both standard and custom extrusions.

Modern Cupolas — Ford Motor Co. is installing three new 90-ft-high cupolas at its Cleveland foundry. They will have a capacity of 35 tons of iron melt per hour and each cupola will have its own hot-blast unit.

Bigger Quarters—American Steel Warehouse Co. is building new $200,000 offices near its steel warehouse at Portland, Ore. New lines of mill and steel supplies are being added, as well as $100,000 in modern steel handling equipment.

Southern Mold—Willard Bronze Co. is opening a new precision and permanent mold castings plant at Graham, N. C. It will be known as Willard Industries, Inc.

Rare Metals Move — Max Zuckerman & Sons, rare metals specialist, and its affiliated company, Maryland Alloys Corp., have moved into a new plant at Owings Mills, Md., near Baltimore.

Fibre Spread—Taylor Fibre Co., Norristown, Pa., is finishing expansion and modernization programs at the Betzwood, Pa., and LaVerne, Calif., plants. Betzwood now has expanded facilities for copper-clad laminates and a quality control lab.

Going Up — Fenwal, Inc., is building a new plant for its engineering and manufacturing departments at Ashland, Mass. The new temperature control plant will have over 106,000 sq ft of production, laboratory and office space.

Aluminum Awards — Aluminum Extruded Products Div., Aluminum Assn., has set up two new awards for design in aluminum extrusion. They include: Most ingenious extrusion; and, most ingenious finished part made from an extrusion.

Siding Start—U. S. Aluminum Siding Corp. has opened a new multi-million dollar manufacturing plant at Franklin Park, Ill. It has 56,000 sq ft of factory space and complete equipment to process aluminum coil into building products.

Tube for Dam—Aluminum Co. of America's Lafayette, Ind., works is supplying aluminum tube for the giant Glen Canyon Dam at Page, Ariz. The tube is being imbedded in 5 million cu yd of concrete.

Canadian Shift —Nesco Aluminum, Ltd., of Vancouver and Calgary, Canada, is building a $125,000 fabricating plant at Regina, Sask. It will make aluminum and steel roofing and siding for agriculture and industry.

Highway Section—Kaiser Aluminum & Chemical Corp. has formed a new organization to develop and sell aluminum highway products. It will operate from Kaiser Center, Oakland, Calif.

Automated Plant—Northwestern Metal Co. is building a new automated nonferrous smelter and scrap handling facility at Lincoln, Neb. It will be equipped with gas-fired reverberatory aluminum, brass and white metal melting furnaces.

Another Phase—Joseph T. Ryerson & Son, Inc., Chicago, has entered the lift-slab field. The company now provides service on reinforced or prestressed concrete lift-slab construction for public and commercial structures.

Handling Advance—Blaw-Knox Co., Pittsburgh, has developed a pneumatic system for handling dolomite, lime and ore. It will speed the open hearth steelmaking process and can be used comprehensively or to supplement existing handling methods and equipment.

BALAS COLLET MFG. CO. reports...

"tool life up... rejects down, with switch to TIMKEN® STEEL"

Balas Collet Manufacturing Co. chose to make their collets from Timken® alloy steel to help reduce production costs. Controlled grain size and annealing increased their tool life and reduced their machining costs. Controlled analysis resulted in more uniform results in heat treating. Less warpage was experienced in the heat treating process.

Because of the uniform machinability and hardenability, of the Timken alloy steel, savings started immediately. Tool life increased, machining costs fell. Production rates increased and rejections dropped. Balas reports less breakage and longer life for their collets.

Timken steel helps make savings, improve products, because we guard its quality at every manufacturing step. And from bar to bar, order to order, the high quality of Timken steel machining bars is uniform. They machine fast, easily and with good surface. Scrap loss is reduced, machining time is saved. Product quality is maintained.

Timken Company steel experts will gladly work with you on your machining bar requirements. They'll help you select the analysis that will do the best job at lowest cost. Write: The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Makers of Tapered Roller Bearings, Fine Alloy Steel and Rock Bits.

TIMKEN®
FINE ALLOY STEEL

TIMKEN ALLOY STEEL AND SEAMLESS STEEL TUBING ARE AVAILABLE FROM STEEL SERVICE CENTERS IN 44 CITIES IN THE UNITED STATES

Sharpen Control of Cash Flow

Improved handling of a company's cash comes from sound management.

Many methods can be used for more effective control of working capital.

■ Sound handling of company cash is an important test of management skill.

With the cost-price squeeze, managers are more interested than ever in effective use of working capital. The cost of borrowing has also put emphasis on better money management.

Do More With Less—Through careful planning, management can do a lot to improve the company's cash position. How much is pointed out in a new study by the National Industrial Conference Board. The year-long analysis of the practices of over 200 companies describes methods of using cash more efficiently, making it possible to get along with less.

Here are some of the findings:

For better money management many companies are sharpening their cash forecasts, tightening control over sources and applications of funds, investing cash surpluses more vigorously, and paying more attention to their relationships with banks.

Forecast Your Needs—Especially effective is cash forecasting, both for the short-term and the long-term. Almost all the companies in the survey try to forecast their short-range cash positions at regular intervals. Many also make long-range projections of cash, either on a regular basis or as needed.

Why make short-range forecasts? These are needed to determine operating cash requirements, anticipate the need for short-term financing, and manage investment of surplus cash.

The one-year cash forecast is the most frequently used. But, depending on the purpose involved, the forecast period can vary from one week to two years.

In contrast, long-range forecasts generally aim at gaging impact of proposed long-range plans (company acquisitions, new product devantage of discounts; balancing cenon the company's balance sheet for three, five and even ten years ahead. These forecasts, useful in arranging long-term borrowing, are generally prepared for a five-year period, the NICB notes.

Regulate and Invest — What methods can a company use to operate on lower cash balances? Numerous ones are mentioned, including: Speeding up collections of money due the company; tightening control over inventory investments; controlling payments to take advantage of discounts; balancing central and regional bank deposits; and investing cash surpluses.

Investing surplus cash is a good way to put money to work. More than 80 pct of the companies questioned invest surpluses regularly. Most favored forms of investment: Government securities and, to a lesser extent, prime commercial paper and state and municipal bonds. The three tests companies apply to these investments: Their security, market-ability, and yield.

How U.S. Spending Grows

■ One of industry's best customers is government—Federal, state and local.

The President's request for a defense spending speedup will increase government buying. But, even before this shot in the arm, the government was taking a large share of industry's products.

One Fifth of GNP—Last year, for example, government bought 20 pct of all the goods and services produced. Transfer payments (funds paid out for social security, farm program and other subsidies, veterans' benefits and interest) accounted for another 7 pct.

Total spending by Federal, state and local governments came to $137 billion.

These facts, and others, about government spending are brought out in a new study by the Chase Manhattan Bank of New York.

Up From the 1920's—Government spending amounted to only 7 pct of the Gross National Product in 1900. By the 1920's, it was still averaging 10 pct. Then two developments led to the big breakthrough—the great depression of the 1930's and defense spending during the 1940's and 1950's.

Between 1929 and 1960 government spending increased more than twelve times over.

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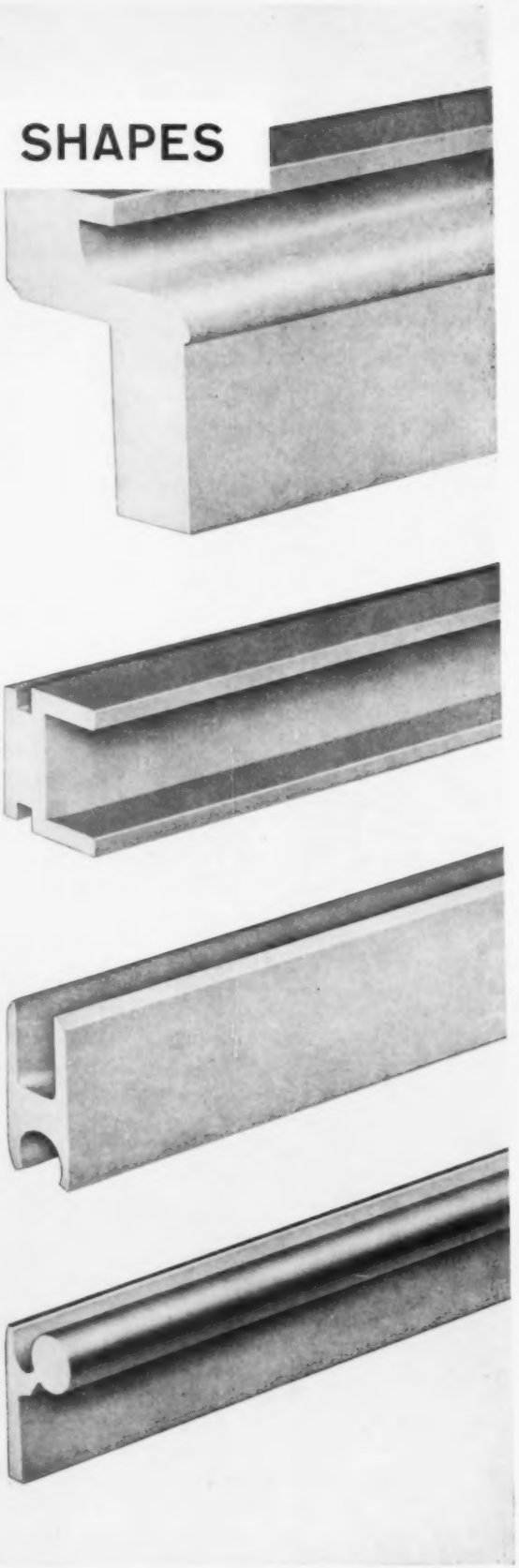

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Multi-Fuel Engine Shapes Up

Military Views New Units At Detroit Diesel

Defense programming has put more stress on the military hunt for a multi-fuel engine.

GM's Detroit Diesel Engine Div. now has a group of engines that run on a variety of fuels.

By A. E. Fleming

▪ With more punch being put into military programming, developments at the Detroit Diesel Engine Div. of General Motors Corp. take on new significance.

Detroit Diesel has a group of engines that run on a variety of fuels. These include various grades of gasoline, army compression-ignition fuel, jet, kerosene and diesel fuels.

The engines perform equally well with each fuel, alone or in any combination. And no engine adjustments are required.

Power Search — Representatives of the Armed Forces have seen the engines perform in military vehicles. The Army, particularly, has been searching for a versatile powering means for some time. Interest centers mainly on the problem of logistics or supply.

In World War II, about 60 pct of all tonnage shipped to combat theaters was refined petroleum products. This climbed to 65 pct during the Korean conflict.

The supply of materials obviously could be cut tremendously if petroleum products could do a wider range of work. It would also reduce concern over available fuel supply in case of all-out war. A shortage of diesel fuel could be made up by an abundance of gasoline, kerosene or other fuels.

Uniform Design—The GM diesel builder maintains it can provide the Armed Forces with 12 multi-fuel engines of uniform design, both V and inline. They "go farther than any previous development in solving logistical problems involved in supplying fuel for all types of military equipment under all conditions," according to company officials.

The engines include models from 20 to 650 hp. They can be used in such devices as pumps, compressors, cranes, patrol boats, generator sets, tanks, self-propelled artillery and jet starting units.

No Contract—One aspect of the multi-fuel program is that it was worked out without a military contract. No government funds were allocated.

GM representatives say there is no immediate demand for civilian or commercial use of multi-fuel engines. If multi-fuel powerplants are successful, it will be due strictly to military use. That is where the demand lies today.

However, it is believed that success with multi-fuel engines in the Armed Forces could lead to commercial applications in the future.

Adapted Models — Detroit Diesel's multi-fuel engines actually are adaptations of its commercial 53 and 71 series. Therefore, tooling and plant facilities for the multi-fuel line, located in Detroit, are complete. Production could start at once.

The entire multi-fuel line is offered in only two cylinder sizes. There is wide interchangeability of parts.

VERSATILE ENGINE: Pointing up the efficiency of Detroit Diesel's multi-fuel engine on both gasoline and diesel fuels, a small lever permits the operator to switch fuels at will. It is not needed in actual operation as the engine takes any fuel or mix without adjustment.

QUICK TRIP: North American Aviation's Sabreliner, on order for Air Force, recently set an unofficial speed record for its class of 413 mph on a 3873 mile trip—from Spain to the U. S. in 9 hours 39 minutes.

Defense Buildup: What It Means

President Kennedy's military buildup program will give a big boost to West Coast industries.

In the last fiscal year, California got 24 pct of the nation's defense procurement budget.
By R. R. Kay

■ What will the $4.5 billion program for a military buildup mean to the Coast's economy?

Answer: About $1 billion in new manufacturing contracts—plus added military payrolls and spending.

A spot check shows: Aerospace industry leaders fully expect this new money to start to flow into the economy within four to six months.

Modern Gold Rush—California, alone, got 24 pct of the Pentagon's 1961 procurement—a staggering $4.9 billion. Now add Seattle with its giant Boeing Co. business. You can easily come up with a $1 billion figure in new defense spending on the Coast.

Even before President Kennedy's program to meet the Berlin crisis, the Coast's aerospace industry had a backlog in billions of dollars. One sector, Los Angeles' electronics industry, predicts a 10 pct sales hike within a year—and that it will need 10,000 more workers.

Electronics Lead—Electronics is now ahead of aircraft as the largest factory employer in the Los Angeles area. Total persons at work in electronics: 132,800. That's 4000 more than in aircraft.

Pentagon planners are changing their spending patterns. Plane and parts makers are getting more contracts. In fact, the aircraft business looks a lot brighter right now than it has within the past three years. That's when the Defense Dept. started to put the push on missiles, and away from aircraft.

Memo to Marketers—A good slice of defense work goes to the big aerospace companies. They all do a lot of subcontracting. Many of them pay out 50¢ of every $1 they receive to subcontractors and suppliers.

The giant aerospace companies, many of them based on the West Coast, are still on the hunt for good subs. So it looks as if there'll be plenty of work around for many years ahead.

Do Engineers Lack The Proper Image?

The Soviet Union has upgraded its program for teaching of engineering. Professional engineers must project the proper "image" of themselves to the public. And the U. S. must strengthen the role of its scientific and technological advisers.

These topics got a good going over at a Seattle meeting of the National Society of Professional Engineers.

Creative Image—Noa E. Hull, Houston, Texas, immediate past president of the National group, said the "image" has hurt recruitment into the field. "I think it is because people confuse the work of engineers with that of scientists. Engineers are creators of things and services that are useful to mankind."

New Tools for Measuring Needed

Products of the Future Will Demand Precise Parts

Accuracy in measuring is one of the vital needs in metalworking today and for the future.

Much progress has been made. But each new scientific and technical development demands even closer tolerances.
By R. H. Eshelman

■ Progress in metrology—the science of measurement—is one of the vital needs in metalworking.

Quality and reliability of products hinge on the ability to measure, to mate parts and assemblies and avoid unwanted interferences. So do improvements in machine tools, automation and manufacturing.

Importance of this specialized area is underscored by reports from Russia. There a big drive is on for better measurement, and its related science and technology. Actually, metrology covers more than just measurement of an end item against specs, gaging and inspection.

Precision Parts—Performance of thousands of parts, as in a missile, automobile or machine tool, depends, in part, on the precision that can be built into it.

Just as important in the future may be the ability to measure temperatures of thousands of degrees (of metals and other materials) to a fine accuracy, astronomical distances, or radiation.

The Broad Scope—The National Bureau of Standards is concerned with the broad scope of these problems. Also, it's interested in the minute ones of defining measuring gage standards ever more precisely.

Nuclear and X-ray thickness gage standards even more precisely. Pneumatic, electronic or mechanical gages are tied to in-process control of automated machining sorting and assembly.

New Idea—The concept of mating measurement to control of machines meant a radical departure from past production practices. Instead of producing parts and then checking them, the new idea weds the measurement during production to automatic control.

Close Check — Private laboratories, such as Sheffield's Eli Whitney Metrology lab, are doing much to further progress by rapidly applying new technology in metrology.

An example is a new type of electronic instrument capable of measuring holes down to 0.017-in.

Holds Seminars—The new unit checks size, taper and bellmouth to within five millionths accuracy. An even more recent development is a production gage for checking holes as small as 0.010 inside diameter.

To assist industry and government people to keep up to date with new developments and instrumentation in precision measurement, Sheffield holds several two-day technical seminars each year.

INSIDE INFORMATION: Machine measures inside diameter of holes as small as 0.017-in. with an accuracy of a few millionths of an inch.

MEN IN METALWORKING

A. H. Reynolds, elected vice president — long range planning, Leeds & Northrup Co.

National Steel Corp.—J. J. Gallagher, named general manager, sales, Weirton Steel Div.; J. E. Bartholomew, named district sales manager, Chicago office; A. J. Palmer, named district sales manager, Lansing office, Great Lakes Steel; T. A. Crews, named asst. district sales manager, Detroit district office, Great Lakes Steel.

Allis - Chalmers Manufacturing Co.—L. J. Linde, appointed director, engineering, Industries Group; C. R. Carlisle, appointed manager, Hartford; D. R. Silvestrini, appointed manager, industrial sales, Boston; J. W. Snarr, appointed manager processing industry sales, Chicago; L. J. Frick, appointed manager, Industrial Equipment Div. sales, Midwest region.

Jones & Lamson Machine Co.—H. A. Finch, elected president; J. A. Gerard, elected vice president.

Lionel Corp. — J. A. Barclay, named vice president, research and development.

Kelite Corp.—L. C. Sorensen, elected chairman of the board; William Sorensen, elected president; Louis McDonald, elected executive vice president.

American Orbitronics Corp.—LaVerne J. Tobin, named vice president, sales.

Pittsburgh Coke & Chemical Co.—W. R. McGarry, elected president, U. S. Concrete Pipe Co. Div.

Fairbanks, Morse & Co.—S. K. Howard, named director, marketing, Beloit (Wis.) Group.

Pioneer Screw Co. — Howard Unger, appointed vice president and general manager; Arnold Haram, appointed vice president, sales.

North American Aviation, Inc.—W. C. Hobbs, elected vice president.

General Motors Corp.—B. L. Lemmer, Jr., appointed general superintendent — plant engineer, Chevrolet Motor Div., Engine plant.

L. P. McAllister, elected vice president-production, Lukens Steel Co.

Anaconda American Brass Co.—W. T. Chamberlain, appointed manager, development, effective October 1; C. S. Hungerford, Jr., appointed export manager, Anaconda Metal Hose Div.

General Dynamics/Electronics—T. Gordon Hame, appointed manager, advanced development, communications, Military Products Div.; Hanno Koegel, appointed manager, sound products engineering, Commercial Products Div.

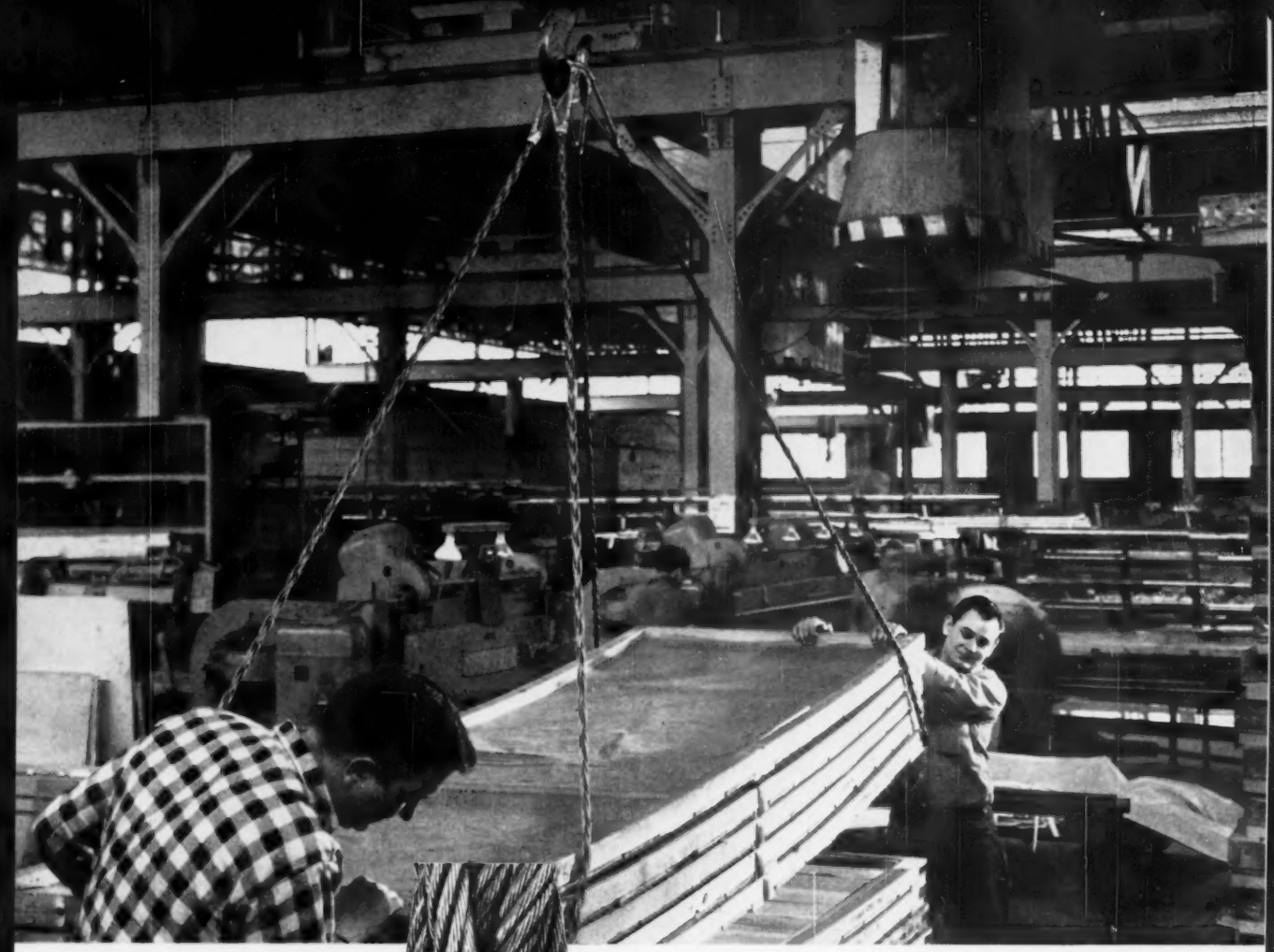
Machinery Associates, Inc.—C. D. Day, elected president.

(Continued on P. 56)

J. C. Crouch, elected vice president, McKay Co.

E. H. Perkins, Jr., elected president, Brooks & Perkins, Inc.

W. H. Lackey, elected vice president-sales, Lukens Steel Co.



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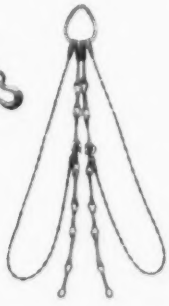

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(Continued from P. 54)

Metal Finishing Suppliers' Assn., Inc.—J. G. Carrique, elected president.

Armco Steel Corp.—T. G. Marshall, appointed manager, contract administration; J. E. Maddox, named asst. to the manager, Ashland, Ky. Works, Armco Div.

Clark Equipment Co. — Carl Monroe, named southwest district sales manager and Ivan Hawk, appointed southeast district sales manager, Industrial Truck Div.

United States Steel Corp.—C. T. Mueller, named northern area manager, customer technical services; C. H. Stewart, appointed manager, Garland (Texas) Works, Oil Well Supply Div.; J. R. Hamilton, appointed manager, customer technical service, Central Operations; W. A. Dennis, appointed central area manager, customer technical services.

Alan Wood Steel Co.—Malcolm Martin, named superintendent coke and chemicals dept.

G. H. Lee, appointed vice president, operations, Metallurgical International, Inc.

Youngstown Sheet and Tube Co.—E. F. Rogers, named asst. superintendent, butt weld tube mill, Campbell Works; H. J. Smith, appointed asst. superintendent, production, Indiana Harbor Works.

Bethlehem Corp.—Ralph Stalbaum, appointed district manager, offices in New York City.

Misco Precision Casting Co.—R. W. Arter, appointed sales manager, Airfoil Products; J. H. Boyle, appointed sales manager, Special Products; Rex Eberly, appointed sales manager, Industrial Products.

Vickers Inc.—M. R. Fox, appointed customer services manager; R. J. Render, appointed product planning manager, Industrial Dept.; Roy Golze, appointed midwestern regional manager, Industrial Sales Dept., Machinery Hydraulics Div.

Consolidated Electrodynamics Corp.—D. E. Murphy, appointed asst. to the president.

Columbia Steel and Shafting Co.—J. F. Jackson, appointed manager, Houston sales district; Robert Koons, appointed manager, Tulsa, Okla. sales district.

Eutectic Welding Alloys Corp.—M. L. Stano, named district manager, southeastern Wisconsin.

Electric Machinery Manufacturing Co.—J. J. Wall, Jr., named general sales manager.

(Continued on P. 58)

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HACKENSACK — The Eaton Company
INDIANAPOLIS — Donald McIntire
MEMPHIS — Branch-Merwin Tool Specialists
MILWAUKEE — Ford Tool Company
MONTREAL — Humphrey D. Walton
NEW HYDE PARK — The Eaton Company
NEW YORK CITY — J. V. Cremonie (Export)
PHILADELPHIA — General Tool Sales Co.
PHOENIX — D'Eugenio Tool Center
PITTSBURGH — Ralph Esposito & Co.
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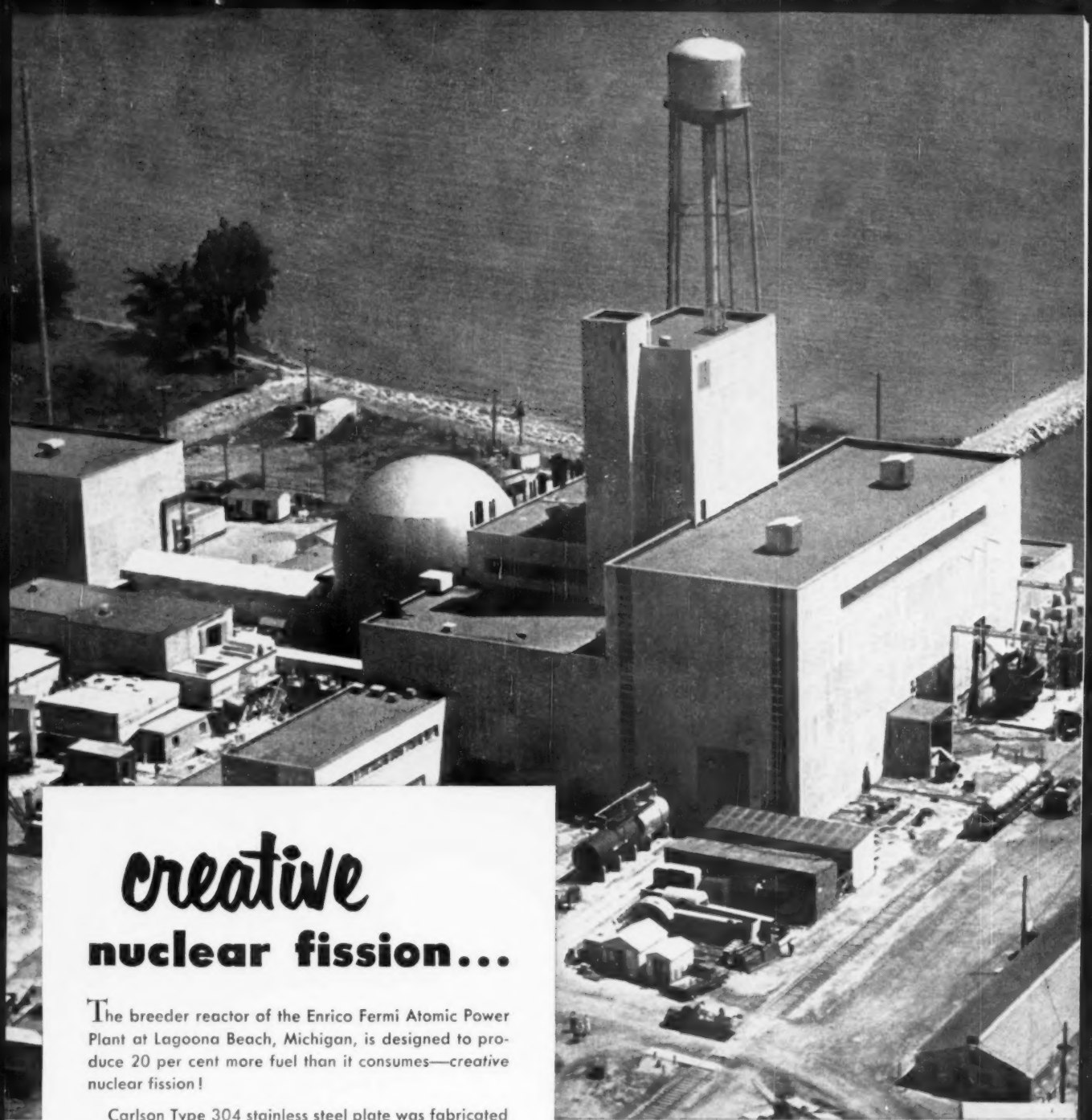

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(Continued from P. 56)

Olin Mathieson Chemical Corp.—U. R. Jaeger, appointed special projects manager, Metals Div.; T. J. Whitby, appointed information scientist—metallurgical, New Haven research services dept.

Rotor Tool Co.—William Beatty, named sales engineer.

Sylvania Electric Products Inc.—J. S. Kratz, appointed product sales manager—metallurgical products.

Union Carbide Metals Co.—Dr. D. M. Gillies, appointed director, research.

Acme Steel Co.—J. L. Scarry, named asst. general superintendent, primary production, Riverdale plant.

Daystrom, Inc. — Bert Fleming, appointed senior manufacturing engineer, electro-mechanical devices, Military Electronics Div.

Bay State Abrasive Products Co.—J. G. Mooney, appointed abrasive specialist, Southeast District; J. V. Stanton, appointed to Philadelphia and Northern New Jersey sales district.

Gerber Scientific Instrument Co.—W. V. McRae, Jr.—appointed eastern regional manager.

International Nickel Co., Inc.—N. A. Matthews, appointed group leader, ferrous metallurgy, research laboratory.

Designers for Industry, Inc.—J. E. Witzky, named special consultant.

Stauffer Chemical Co. — G. B. Brown, named general manager, Metals Div.

Thiokol Chemical Corp.—S. M. Smolensky, appointed general manager, National Electronics Div.

Michigan Chemical Corp.—G. J. Coleman, Jr., appointed product manager, industrial chemical sales.

Master Chemical Corp.—H. M. Parsekian, appointed general sales manager.

Motorola Inc.—F. C. LeGere, named regional sales manager, New York.

Pangborn Corp.—J. V. Haider, appointed manager, Pittsburgh sales district.

Hyster Co.—R. G. Buchignani, appointed southern regional representative, Industrial Truck Div.

United Shoe Machinery Corp.—E. E. Tschantz, appointed chief engineer, Fastener Div.

OBITUARIES

B. F. McClancy, 57, general manager, Associated Industries of Cleveland.

W. D. Kirkpatrick, 74, former vice president and member of the board, American Chain & Cable Co., Inc.

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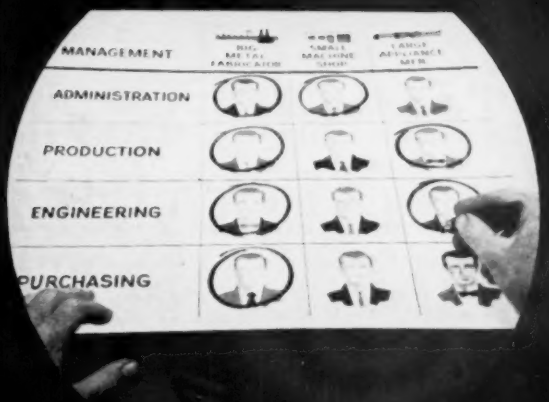

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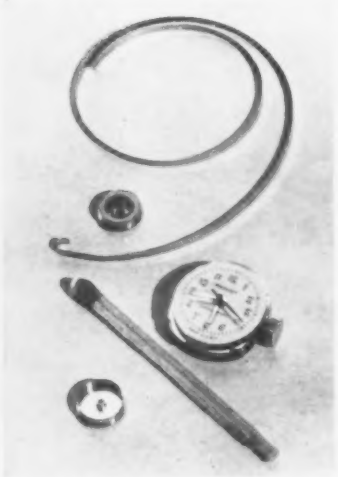
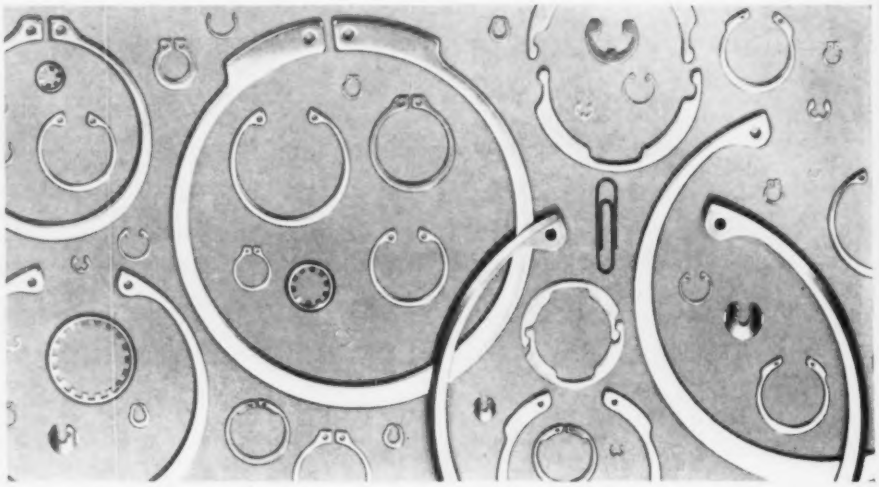


Armco 17-7 PH adds reliability to watch mainspring



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3. **They're available in a complete range of forms**—In sheets, strip, plates, billets, bars and wire—Armco Precipitation-Hardening Stainless Steels are available in the form, size and condition to do the job. They're *readily* available, too—direct or through one of the Armco Stainless Steel Distributors listed here. For detailed information, fill in and mail the coupon.

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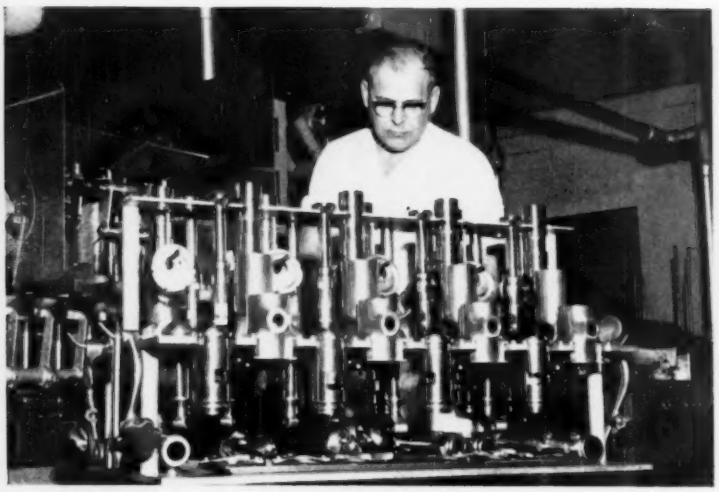

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CENTRAL STEEL & WIRE COMPANY (AB)
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CHICAGO STEEL SERVICE COMPANY (AB)
Chicago, Ill.

CLEVELAND TOOL & SUPPLY COMPANY (B)
Cleveland, Ohio

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Providence, R. I.—Fall River—Natick, Mass.

C. A. CROSTA, INC. (A)
Denver, Colo.

DUCOMMUN METALS & SUPPLY COMPANY (AB)
Los Angeles, Calif.—Berkeley—Phoenix—San Diego—Seattle

EDGCOMB STEEL & ALUMINUM CORP. (AB)
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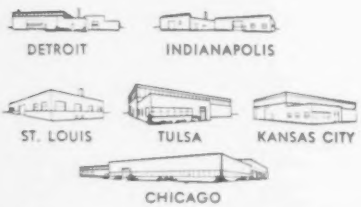

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You Arbitrate It!

One-Day Bump

■ Under contract layoff provisions, senior steel-foundry employees facing layoff had the right to claim jobs of junior men, provided they could do the work. But it was up to the senior man himself to inform the personnel office if he wanted to bump.

Shortly before 5 pm one day, Victor C., who worked on the 6 am to 2 pm shift, was telephoned at home. He was told he would be bumped the next day by a man with more seniority. Since the personnel office was closing in half an hour, he couldn't do anything about it that day. The next day, however, he found another job that a junior was on and claimed it. By the time the bump became effective, he had lost a day's work.

Make It Good—That led to a grievance. "Personnel department hours are within management's control," said the chief shop steward. "The company should make good any losses that result. If you kept open later, Victor wouldn't have lost a day's pay."

"You can't expect us to keep the personnel office open around the clock. This sort of thing will happen once in a while where you have chain bumping. We don't owe Victor any back pay," was the company's answer.

Eventually, the case went to arbitration under the Rules of the American Arbitration Assn. How would you rule?

The Arbitrator Ruled:

He said that even if Victor had been able to claim another job before the personnel office closed, the other man might have been caught short. "Obviously, the company cannot be expected to control layoffs and employee work scheduling so as to preclude some loss of work by employees during the bumping process. Sustaining this grievance would place upon the company monetary penalties not contemplated by the layoff and scheduling provisions of the contract."

From the files of

The American Arbitration Association

"**You Arbitrate It!**" appears in the second issue of the The IRON AGE each month. Look for it in the September 14, issue.

CAUTION: The award in this case is not necessarily an indication of how arbitrators might rule in apparently similar disputes. Each case is decided on the basis of the particular history, contract, testimony and other facts involved. Some of these essential details may have been omitted in condensing the original arbitration for brief presentation.

FIRST ALL-NEW FACILITY FOR THIN TIN PLATE

Wean will build cleaning line for Weirton Steel's expansion

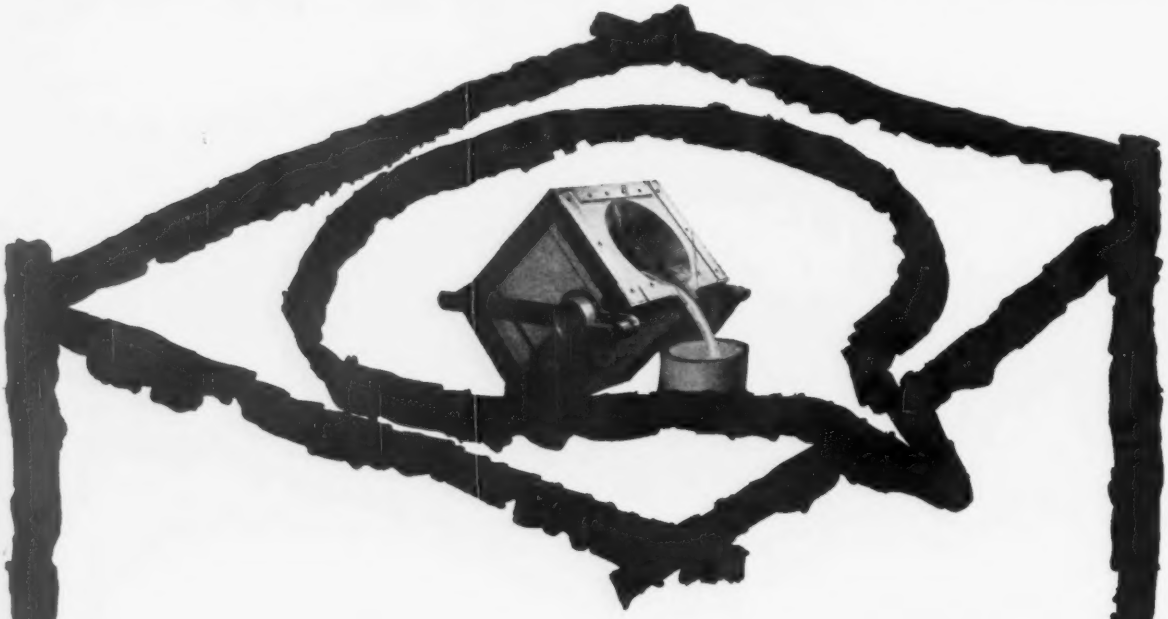
Weirton Steel Division of National Steel Corporation will expand its supply of thin tin plate product for the container market by 300%—marking the first installation of processing equipment specifically designed to treat thin tin plate. The new, high-speed Wean line incorporated in this expansion will clean, chemically treat and oil the light-weight tin plate, which can be shipped to container manufacturers at reduced shipping charges and lower initial cost.

Weirton Steel will be able to handle 60,000 lb. coils on this new line, processing the thin tin plate at speeds up to 2200 fpm. Other features of the line include precision tension control, balanced rolls, and rigid design to assure uniform strip tracking.

This pioneer installation designed specifically for thin tin plate is only one example of Wean's experience in this field. Over 80% of the world's supply of *all* tin plate is produced on Wean equipment—as is the thin tin plate processed by eight of the nine current producers. This unique background of engineering "know-how" can help you in planning your requirements.

THE WEAN ENGINEERING COMPANY, INC. • WARREN, OHIO

WHY BIG THINGS ARE HAPPENING IN INDUCTION MELTING



Everybody likes change! Particularly the kind of money-saving changes introduced by Inductotherm to induction melting in the past seven years.

To the basic advantages of induction melting, Inductotherm has added features that assure lower costs by simplifying installation, speeding operation, and reducing service requirements.

- Inducto® power feed through tilting furnace trunions cuts the cost of pit construction; saves power losses by reducing cable length.
- Rigid, heliarc welded furnace frame construction improves furnace life and lining life.
- Prepackaged, pretested Inducto control centers take the time, trouble, and expense out of control installation; make start-up swift, sure, and easy.
- The most space-saving induction melting systems ever available are the Inducto "Integral" series, which package motor-generators, capacitors, transformers and all controls *in one compact console!*

Big things are happening in induction melting because Inductotherm is making them happen. But the biggest innovation has been the Inductotherm concept of service. Not just fast repairs and overnight replacement of any parts . . . but the fact that *Inductotherm is in business to fit induction melting to your needs.* We will do everything in our power to improve our equipment and the induction technique, never asking you to trim your requirements to the limitations of our equipment.

If you'd like more information on Inductotherm furnaces, write for Bulletin 70. But, for a taste of Inductotherm service, ask to have an engineer call. Inductotherm Corporation, 412 Illinois Avenue, Delanco, New Jersey.

INDUCTOTHERM

Rocket Chamber Passes Test

Avco Corp. has just completed successful hydrostatic tests on a second-stage Minuteman ICBM chamber. This chamber is believed to be the largest titanium rocket chamber ever hydro-

ICBM CHAMBERS: Ready for use.

tested. Titanium reduces chamber weights by about 30 pct as compared to conventional steel construction.

NASA To Service AT&T

As many as five communications satellites will be launched by NASA next year. The space agency will launch two and perhaps four satellites for AT&T. The company will build its satellites at its own expense and will pay NASA $6 million per shot for launching and tracking costs. NASA will also launch an RCA-built communications satellite of its own sometime in 1962.

Versatility for X-15?

Novel landing-gear skids will soon appear on the X-15 rocket plane. These skids resemble wire brushes on skis. Due to the thermal heats which the plane encounters at supersonic speeds and high altitudes, heavyweight air conditioning would be a must for normal landing gears. Present skids on the X-15 are only good for dry lake beds. The new landing devices will serve on standard asphalt and concrete runways.

Space-Control Simulators

Three atomic controls evaluation simulators (ACES) will soon make Dallas the nation's space-on-earth center. The first ACES is a 12 ft long, 30 x 36 in., aluminum-tubing platform. It weighs 1350 lb; yet it literally floats on air. This simulator's only link with its ground base is a 4½-in. steel ball. A column of nitrogen, pressurized to 120 psi, keeps the ball afloat.

Lubes Bearings at 1500°F

A new high-temperature lubricating process uses chemical coatings in lieu of conventional liquids and powders. This process chemically converts bearing-part surfaces into a multi-metal alloy with lubricating properties. Depth of treatment is about 0.000001 in. Even at 1500°F the lubricated surface takes high loads.

Eases Strain-Gage Work

It's hard to line up ultrathin strain-gage wires on any test sample. And honeycomb panels present special difficulties. But North American Aviation Inc. has found a way to ease this prob-

ALIGN GAGE: To obtain good test data.

lem. Using a 3-D binocular magnifier, a worker views the alignment of a strain gage to a sample's test area. Both of the worker's hands remain free to perform the bonding operation.

Twelve Bids For Apollo

Industry has been asked to submit bids in the next few months for construction of the Apollo spacecraft. Plans call for the craft to carry three men to the moon and back by 1970. A dozen companies will submit bids by Oct. 9. Federal funds budgeted for the Apollo this year total $160 million. Look for a test flight in 1963.

MIDVAC PRODUCES

RETAINING RINGS WITH NO REJECTIONS

CONSUMABLE ELECTRODE VACUUM MELTED NON-MAGNETIC STEELS ELIMINATE 20% REJECTIONS

Where high tensile and yield strength are required in non-magnetic steel many producers of critical parts are relying on Midvac Steels. In the production of retainer rings for generators, rejects which averaged 20% with air melted steels were eliminated with Midvac vacuum melted steels.

The Midvac Process eliminates atmospheric contamination, ingot soundness is improved, segregation is reduced, workability is increased and product quality is stepped up. Midvac Steels are offered in many alloys as billets or forgings to meet the most critical design specifications. Write for detailed metallurgical case history book to . . .

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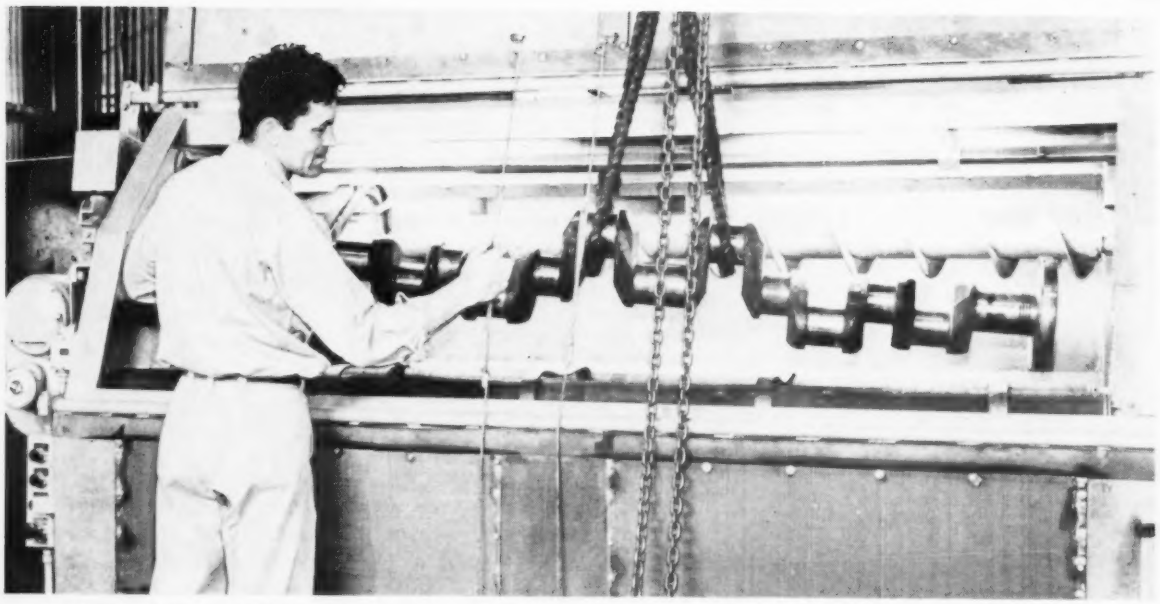


PRECEDES PLATING: Peening of crankshafts is common. It must be done prior to chrome plating.

Shot-Peening Offers New Life To Critical Metal Parts

By **H. O. Fuchs**—Vice President, Metal Improvement Co., Hackensack, N. J.

Have you ever looked into the possibility of using shot-peening in your operations?

This technique has more to offer than you might think. It's good insurance, too.

■ American industry spends about $10 million a year on shot-peening. This expenditure results in a savings of around $50 million in direct labor and materials. Untold amounts of trouble are completely avoided, thanks to the shot-peening method.

Fatigue-failure prevention accounts for over 90 pct of the volume. Some typical values are listed in the table with special emphasis on springs which today are shot-peened as a matter of course for all severe applications.

The balance of shot-peening work is done to improve wear, close small pores, prevent stress corrosion, or for forming.

Auto Springs — All suspension springs and all valve springs in automobiles are shot-peened. So are almost all other springs intended for severe duty.

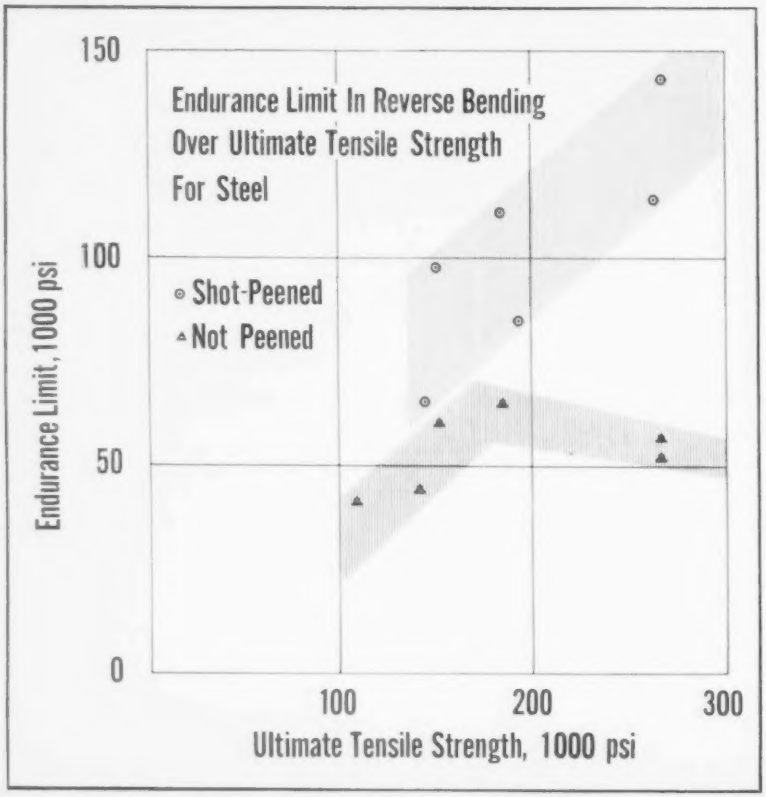
The weight of a spring is inversely proportional to the square of the strength of the spring material. If the strength is increased 40 pct, the weight can be cut in half.

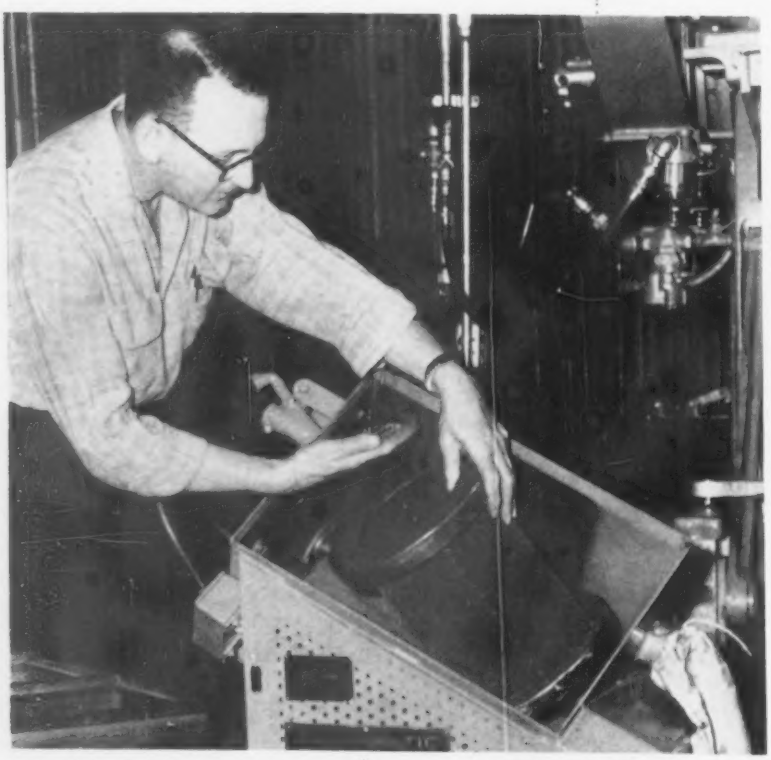
Before shot-peening was used, springs were liable to failure by "metal fatigue." A fracture took place which appeared brittle. It occurred after many thousands of cycles of loading.

Problems Then and Now—Today shot-peening has overcome the problem of fatigue failure. Now the major problem is settling by operating stresses which are raised to the point where they are close to the yield strength. This, in turn, is overcome by the use of harder materials which can safely be used when shot-peened.

These same materials would be too sensitive to scratches and other

Endurance Limit Lengthens





HEAVY DUTY: Most springs intended for future severe duties receive shot-peening treatment. In this way, material weight can be reduced.

imperfections if not shot-peened. Peening practice varies with material size and hardness.

The Bureau of Standards' results on music wire were obtained with 0.009-in. diam shot. Although the Almen intensity isn't published, we guess it was less than 0.008 A.

Torsion Bars—For steel torsion bars of 2-in. diam and 48 Rc hardness, the SAE recommends 0.055-in. diam shot and an intensity of 0.010 C (which would correspond to 0.035 on an extended A scale).

Leaf springs are peened on the tension side only. An intensity of 0.014 A would be good practice for a leaf of about ¼ in. thickness.

Another Story—Since shot-peening can increase the fatigue strength of springs about 50 pct, one might assume that the same is true for shafts. Here, however, the conditions are slightly different.

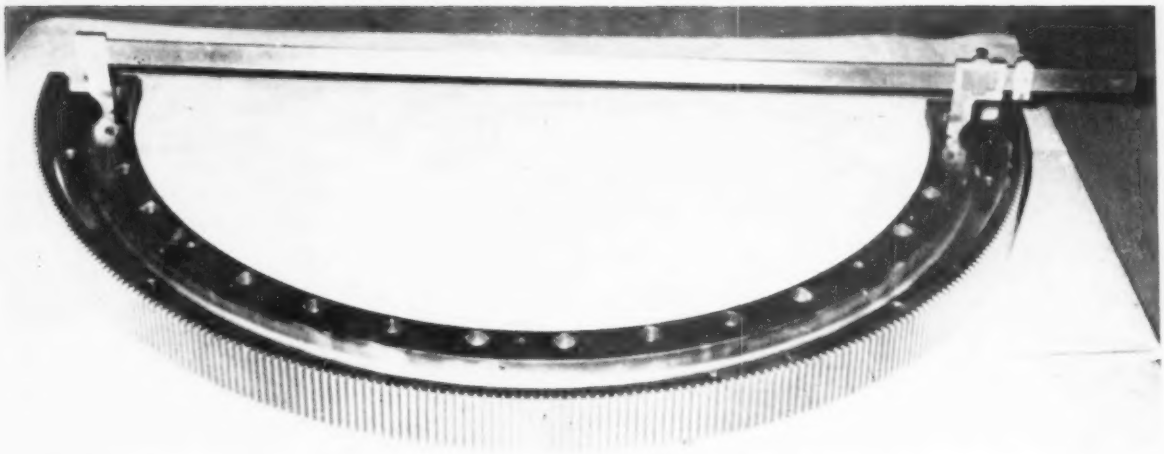
On a highly finished steel shaft without stress raisers, subject to fully reversed bending, the improvement might be only a few percent. On the other hand, automotive axle shafts from production runs might show improvements up to 200 pct. The difference is due to the stress raisers present on the axle shafts.

In general, we can expect more improvement from shot-peening on parts which have stress raisers, such as fillets, splines, keyways, or poor surfaces.

In the Fillets — Crankshafts are typical of machine parts which must have stress raisers. They are very often shot-peened, particularly in the fillets.

Stress raisers of a special kind are introduced by chrome plating, which is used to build up worn areas of shafts or to provide a wear-resistant surface. Shot-peening prior to chrome plating is an excellent practice. But chromium plating without shot-peening cuts endurance down to half its original value.

Studies on Gears—Gears are another example of parts which must include stress raisers to perform



PEEN-FORMING USES: The peening technique is capable of forming ring gears to exact hole spacing.

their function. Carburized gears with a hardness of 60 Rc can be successfully shot-peened with steel shot (40-50 Rc) which is much softer than the gear surface.

The service experience on shot-peened gears concludes that gear maker's standard practice permits a higher design stress on shot-peened gears.

The Whole Picture—A few comparisons of peened and un-peened fatigue strength are given in the table. Thinking only in terms of such data fails to bring out a very important point.

The ideal part is not obtained by first finding the shape and hardness which give best performance without peening and then adding a shot-peening operation. Instead, look for the best combination of shape, hardness and peening.

The latter procedure will always result in the choice of greater hardness, and may result in the choice of a shape with more severe theoretical stress concentrations.

Without peening, the best possible hardness is that at which the greater sensitivity of harder material to stress concentrations and surface imperfections just balances out the increase in basic strength which could be obtained to greater hardness.

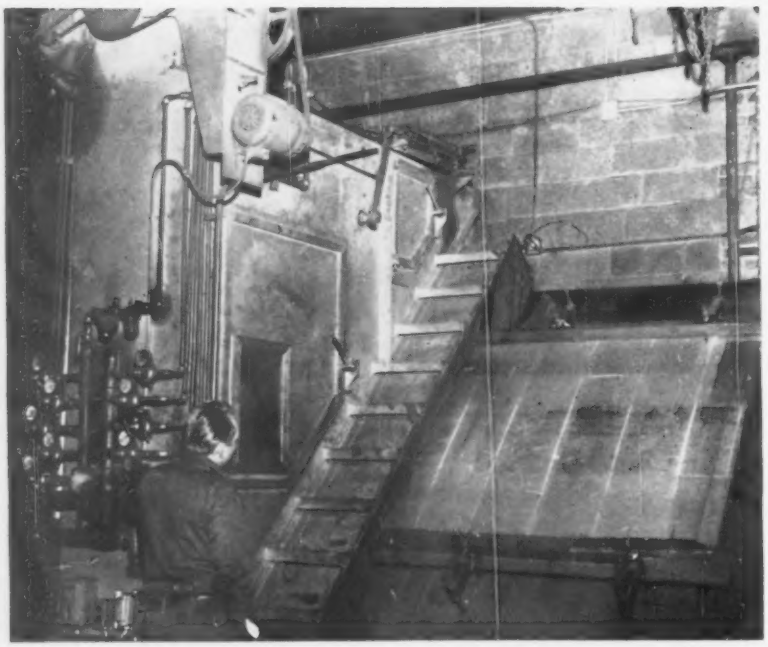
For many applications this balance is found in the hardness range near 42 Rc. With shot-peening, the sensitivity of harder steels is overcome to a very large extent and parts of 52 Rc become practical and reliable.

This is confirmed by the use of steel at 52 Rc for such parts as tor-

Increases Fatigue Strength

PART	DESCRIPTION	Test Duration, millions of cycles	Fatigue Strength, psi		Improvement, pct
			not peened	peened	
Springs	Music wire, 0.039 in. diam	.4	120,000	190,000	58
	Oil tempered, 0.207 in. diam	10	85,000	120,000	41
	Hot coiled 1095, 3/4 in. diam	2	60,000	90,000	50
	Beryllium copper, 0.148 in. diam	10	40,000	78,000	95
	Stainless 18-8	10	80,000	120,000	50
	S-816	10	55,000	100,000	81
Shafts	Polished smooth 1020	10	34,000	37,000	8
	Auto axles, 420 Bhn	10	13,000	43,000	230
	Chromium plated 4340, 52 R.	10	47,000	102,000	117
Gears	4118 Carburized	5	23,500*	30,200*	29
	TS 862 Carburized	5	12,500*	15,200*	22
Inducers	Cast aluminum alloy	6	15,000**	21,000**	40
	Machined aluminum alloy	1	18,000**	37,000**	205

* Test loads are reported, not test stresses.
** Test deflections are reported, not test stresses.



WING SKINS: Peen-forming is often specified by the aircraft industry to take care of the curvature which varies along the wing.

sion bar springs and aircraft landing gears. This practice has the added bonus of providing greater static strength and greater resistance against loss of the peening effect by occasional overloads.

More Evidence — To emphasize this point, consider the advantages which go with an increase in hardness from 42 Rc to 52 Rc. If the parts are shot-peened, static strength increases by 25 pct. Fatigue strength is also increased by 25 pct. Scratch sensitivity remains the same.

What happens if shot-peening isn't used? The harder steel is much more sensitive to surface imperfections. As a result, the service fatigue strength is no greater than that of the softer part.

Much use is also made of shot-peening outside the field of fatigue strength improvement. Among the more glamorous uses is the prevention of stress corrosion in atomic-energy installations.

Brink of Glamor—Peened parts of stainless have outlasted similar unpeened parts more than ten times in the presence of air-saturated hot water. Similar results have been reported from the aircraft industry for aluminum alloys in marine atmospheres.

Both fatigue and stress-corrosion failures can be deceiving. They may show up in service on a product which has passed many severe short-time tests. Many companies have gone to great expense developing tests for fatigue and corrosion. Great risk is involved in knowing that these failures can take place.

Low Cost—Since shot-peening is such a small investment, some progressive companies have adopted peening as an insurance against failure. They specify it broadly where there's reason to believe that it may extend the life of parts. As such, they don't have to wait for service tests to prove that peening is needed.

Quite different in its aim is the use of peening for forming. Here the compressive stresses induced by peening are used to shape parts, not to prevent cracks.

Limited but Useful—This technique can be applied to a limited class of parts only. Where it can be used, it can often produce huge savings. The forming is done "in air" without any dies or formed tools. Only templates are required to check the results.

The technique is limited to slender parts. Aircraft wing skins with integral ribs are one example. The curvature which can be obtained depends on the thickness of the skin.

Sheets without ribs and even honeycomb panels can also be formed. Since they tend to assume spherical curvature, special techniques are required. Thus, limits are placed on the degree of curvature.

Correcting Distortion — Ring gears of 3 ft diam and ¾ in. wall thickness which had gone ⅛ in. out of round in heat treatment could be peened to be circular within the required tolerances of 0.005 in. Peening to exact roundness of collets with fingers about 3 in. long and ⅛ in. thick is a routine production feat.

The tolerances you can hold are mainly a function of the time spent in measuring and correcting. In the early days of forming and shape correction by peening, the question of permanance of shape was often asked. Tests and service experience have shown that this poses no problem at all.

Peen-forming helps in some degree to prevent fatigue failures and stress corrosion. A double peening treatment is required to be sure you get these advantages. A relatively light overall peening for strength is then followed by localized heavier peening for shape.

Gears are often shot-peened after carburizing and case hardening. One customer found that the life of a case hardened drive gear was raised from 200,000 cycles of fatigue to 30,000,000 cycles after shot peening.

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Reactive Metals Start to Roll

Industry is well sold on the properties of reactive metals. What it needs is bigger sources of supply.

Here's an integrated facility, ready for production.

It takes time before a company can start producing space metals in the wrought forms that industry demands. An array of special tools must be installed, tested and integrated into a smooth-working production team.

Now that a 300-kw electron-beam melting furnace has just started its shakedown service, you can expect to see increased availability of rod, bar, wire, sheet, strip and even plate fashioned from a number of reactive metals and alloys.

Haynes Stellite Co., Div. of Union Carbide Corp., Kokomo, Ind., now plans to make production runs of columbium, columbium alloys and vanadium. Heretofore, the accent was on wrought tantalum products and hot-pressed tungsten shapes.

Brand New Alloy—Also making its debut is a new high-strength columbium-base alloy that contains tungsten and zirconium. This alloy, called Haynes alloy Cb-752, can be fabricated by conventional methods, including welding. It has an ultimate strength of over 25,000 psi at a temperature of 2400°F.

Early tests indicate that this new alloy is one of the strongest materials of its type above 2000°F. The fact that it can be fabricated and will form a ductile weld joint removes a big stumbling block in the use of high-strength columbium-base alloys. Haynes officials plan to offer mill forms of the alloy in sheet, plate and bar.

Delivery Stage — The integrated facility answers a long-sought goal at the company. Reactive metals are no longer in the laboratory-curiosity stage. They are now ready for the industrial market.

The electron-beam furnace is the latest step toward space-metal production. Among the other plant equipment are a consumable-electrode vacuum-arc furnace, vacuum annealing facilities and a welding dry box.

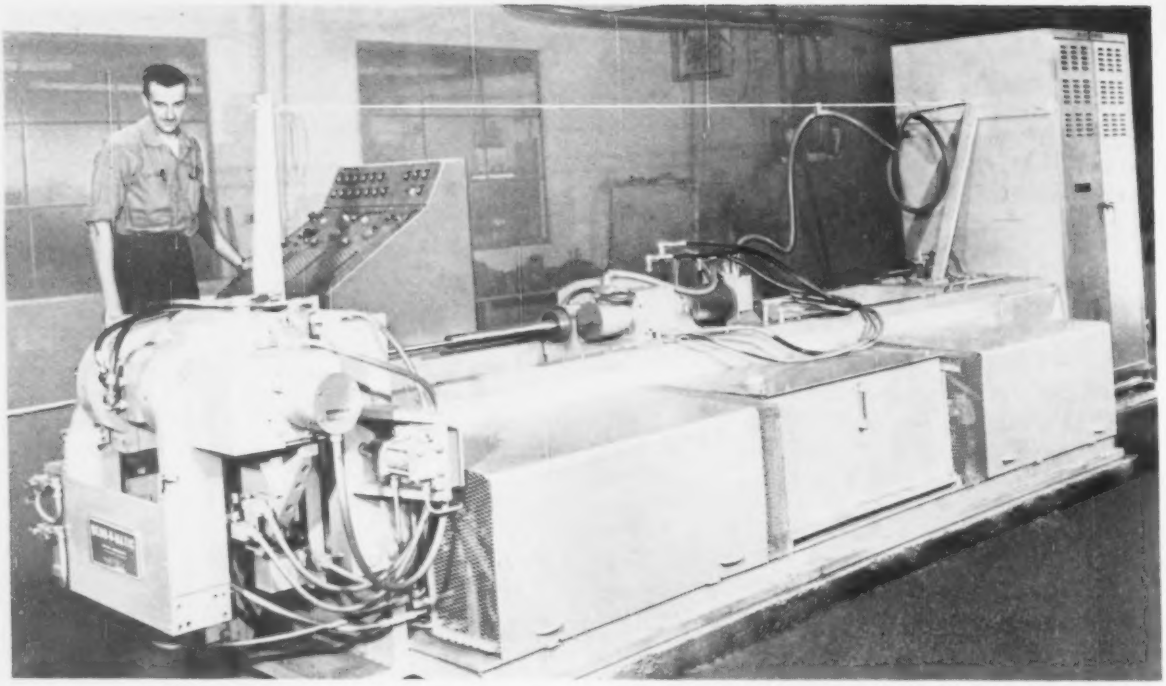
You'll also find a 2000-ton forge press, standard sheet, plate and bar mills, a Sendzimir cold-finishing mill and wire-drawing equipment. Haynes brands of tantalum, columbium and alloy Cb-751 are offered in a variety of sizes and shapes. Minimum thicknesses of all of these materials are 0.020 in. in sheet form and 0.010 in. in strip. Plate can be supplied in thickness up to 0.625 in.

Drawing Capacity—Wire, on the other hand, is available starting at 1/16 in. diam. Rod and bar stock can be supplied within the ¼ in. to 3 in. diam range.

Company officials note that 24 in. is the maximum widths for these metals. However, its mills do have capacity for 48-in. wide sheet. Under certain conditions, sheet of that width can be produced.

Current interest by Haynes Stellite Co. in columbium and its alloys is based on logic. These alloys show great promise in applications where temperatures met would seriously weaken or melt present-day high-temperature alloys. They also offer promise in the expanding nuclear-energy field.

CONTROL CONSOLE: The operator can keep visual tabs on melting procedure inside electron-beam furnace from a central control console.



AUTOMATED BENDING: Numerically-controlled, tube-bending machines turn out bent pipes for missiles.

Punched Tape Calls the Signals On Tough Tube-Bending Jobs

Complex piping systems are the arteries of advanced aircraft and aero-space vehicles.

Bending tubes for these networks was a big problem until numerical controls took over.

▪ Punched tape now regulates tubing production for aircraft, missiles, and space vehicles. A new precision-bending machine uses this control medium to turn out accurate bent-metal tubing up to 1¼-in. diam and 8-ft long.

The machine, developed by the Nu-Era Corp., Rochester, Mich., meets an urgent need in the aero-space industry. It represents a tube-bending advance that solves pressing production problems on intricate piping systems. These systems carry vital hydraulic fluids, fuels, lubricants, water, gases and air that are the lifeblood of sophisticated airborne vehicles.

Already Born—Fortunately, the defense industries had their machine prototype already on hand. The first machine of this type was tailored for tail-pipe bending. (IA—January 21, 1961, p. 94.) It freed exhaust-pipe distributors from crushing inventories. Now, they can supply any American tailpipe from just four basic-tubing sizes.

This tube bender also raised eyebrows in other fields Aircraft and missile firms wanted a precision, tape-controlled bending machine designed especially for their needs.

With Walter P. Hill, Inc. as the builder, Nu-Era responded to this demand. They developed a unit that exceeded expectations. It combines high-production capacity and accuracy, without sacrificing versatility.

Setting Up—After an operator hand fits a piece of soft tubing through the recesses and passages in a missile or airframe, he can quickly measure the various bends and twists. These bend measurements are passed on to the tube bender by numbered buttons on a console.

This information is all the bending machine needs. As it makes the first prototype part, it automatically punches a tape. Once this is done, the unit really moves into high gear. With the tape in command, the tube bender duplicates the part, indefinitely. All subsequent parts are exactly like the prototype model.

One big reason for this performance is that, for the first time, tape-reading and tape-writing equipment are an integral part of the control console. Of course, without basic accuracy, refined design doesn't do much good. Fortunately, the tube bender is up to snuff in the accuracy department as well.

Repeat bending follows absolute dimensional fidelity. The machine holds bend and twist angles to tolerances of ±3′. Linear dimensions stay within ±0.005 in.

Changeover's Easy — Of special importance in short-run production is the reduction in setup time achieved with the benders. Complete changeover from the production of one bending pattern and tube diameter to another can be made in about 35 minutes. This is 1/6 to ⅛ the time it takes a conventional machine without tape-control. Only one minute is needed to change a bending pattern on the same tube.

Just as important, the new machine uses standard dies. This sharply reduces the initial investment that's necessary to get jobs into production.

Of course, once a program has been punched on tape, you can use it time and time again. It will always produce the part to the same close tolerance. The tape can be stored in a minimum amount of space and put back into the machine at any time.

Buttons Take Charge—Now let's follow the tube bender through a typical operation. First, a tube is manually inserted through the bending arm, over a mandrel, and into the collet chuck. "Collet Clamp" and "Cycle Start" buttons are depressed in turn. Then the operator relaxes. The machine automatically performs all tube-advance, twist and bend operations. Programmed tape signals the numerical bosses that guide the operation.

At the end of a cycle, the machine automatically unclamps the part at the operator's signal. Then the main slide returns to the cycle-start position — automatically, of course.

Obeys Orders — The numerical control system itself is also worthy of mention. It's the General Electric Mark III package. Teamed up with the tube bender, it follows taped instructions which control the following functions:

1. Gripping and clamping the tube.
2. Feeding out the proper amount of tube stock for the first bend.
3. Rotating the tube to get the correct angle between bends.
4. Bending tube stock to the exact angle.
5. Signaling the feed length and pipe rotation for the next bend and repeating the cycle.

From all indications, the happy marriage of punched-tape numerical control and tube-bending machines has a great future. Machines of this type should be strong contenders in the building construction field.

Specs Indicate Performance

Capacity

Up to 1¼-in. diam tube—96-in. maximum length

Bending Range

0-185°—3-in. maximum bending radius

Bending Torque

13,200 in.-lb maximum at 1000-psi pump pressure

Hydraulic Power Units

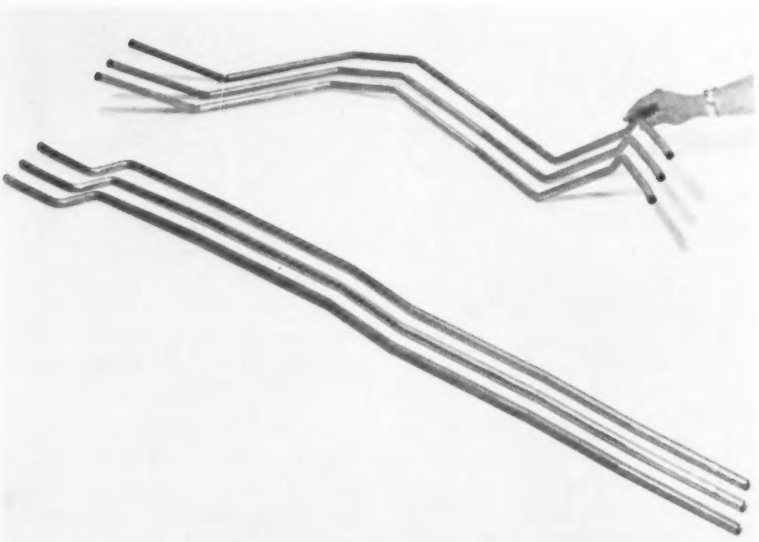
One 10-gpm pump, 1000-psi maximum. Drive source: 7½-hp, 1800-rpm electric motor
Two 5-gpm pumps, 1000-psi maximum. Drive source: 7½-hp, 1800-rpm electric motor

Machine Operation

Load and unload by hand. Operator programs bends. Machine produces punched tape with first part. Next parts produced automatically with original tape

Floor Space

8-ft wide x 22.5-ft long x 7-ft high



TRUE TO FORM: Complex bends are formed in tube after tube with absolute fidelity. Tape controls duplicate any bend pattern on demand.

Low-Cost Nylon-Casting Process Turns Out Complex Shapes

Monomer-cast nylon has many advantages. One prime feature centers on its low cost.

As cast, this nylon serves in abrasive-handling equipment and shock-resistant gears.

■ A new nylon-casting process opens the door to major cost reductions for complex nylon-plastic shapes. Louis L. Stott, president of The Polymer Corp., Reading, Pa., reports: "This new monomer-casting process resembles metalcasting methods."

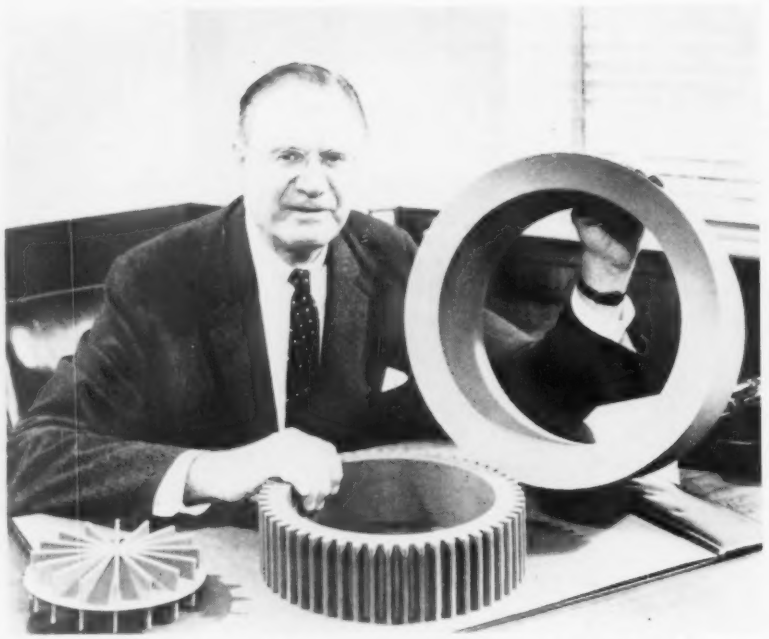
Mr. Stott adds, "we expect monomer-cast nylon to serve in heavy industrial applications." Why? Because the physical properties of these castings equal or exceed those of other nylons.

No Size Limit—Some other advantages include: Low mold costs, unlimited size potential and raw-material costs which are about 50 pct lower than nylon polymers.

Two years of field tests prove the economy of the process. Various shapes can be cast. To date, the largest monomer-cast nylon parts center on semifinished symmetrical shapes in the 500-700 lb range. A steel casting the same size weighs over two tons.

Mr. Stott says his company expects to increase these size limits in the near future. "Theoretically," he explains, "there's no technical limitation on the size of a nylon part which can cast." However, markets must be developed for the very large sections.

Offers Challenge — Called MC nylon, each monomeric casting costs $3.00-$5.00 per pound. Thus the newcomer competes favorably with brass, alloy steel and stainless steel castings.



FINAL PRODUCTS: Mr. L. L. Stott, president, The Polymer Corp., checks some of the parts which were cast directly from monomeric raw materials. The process can also produce gears up to 4½ ft in diameter.

In a few years, it's expected that increased-volume and other production economies will reduce overall costs to about 50 pct of their present levels. This will place MC nylon on a competitive par with aluminum and carbon steel castings.

The basic chemistry in the monomer-casting process was discovered by the Monsanto Chemical Co. In this country, The Polymer Corp. has the exclusive right to use the process for casting nylon shapes.

Tight Controls—In general, monomeric-casting procedures are similar to those used in casting metals. Careful chemical controls are a must. In addition, the purity and the temperatures of all materials and molds have to be closely controlled.

Direct production of finished nylon parts from monomers rather than nylon-polymer powders cuts raw-material costs in half. Unlike other nylon-conversion methods, monomeric casting is done at normal atmospheric pressures.

Costly molds aren't needed. But success hinges on some entirely new handling concepts.

Melts Easily—The caprolactam monomer melts at 150°F. Without using any pressure, it becomes a mobile liquid which fills the mold's recesses. Then the liquid monomer polymerizes into a solid.

A uniform mass results with no vacuum bubbles. This, of course, simplifies mold-design problems. It's also possible to cast parts of unlimited thickness due to this bubble-free phenomenon.

Injection-molded part thicknesses

are normally limited to ¾-1½ in. Extrusion-molded parts seldom exceed 3-4 in. in thickness.

In injection molding large parts, mold costs may run as high as $5000 or more for a seven-pound part. A mold for MC nylon parts of the same size costs from $100-$500.

Limitations — When mold costs are small per unit volume, the new casting process can't compete with injection molding. This is especially true if the injection cycles are short. Monomeric casting requires about five minutes per casting cycle for small parts.

In the extrusion process, tooling costs for an 8-in. diam rod are about $1500. With the new casting process, mold costs for this work are quite low. To cast 4-ft long x 8-in. diam rods, The Polymer Corp. uses a $100 mold.

All molds for MC nylon must be nonporous. Since the molten monomer has a low viscosity, metalcasting sand molds can't be used. However, most metals can serve as permanent molds. Glass and ceramic materials also prove satisfactory.

Key Factors—MC nylon parts must be poured at exact temperatures. You've got to be very careful in adding the catalysts. Since the MC nylon sets up as a result of heat loss, the chemistry of the polymerization process and the temperatures employed play crucial roles.

Certain profiles have been cast up to 4 ft in length. Other plate shapes in 4 in. thickness have been made in sizes up to 4 x 8 ft. These latter parts weigh more than 800 lb.

Tolerances are maintained to 0.03 in. They vary with the nature of the part's shape and the interrelation of critical dimensions.

Any finish available in the mold is faithfully reproduced. Present finishes range from highly polished work to crude sandblasts. At the same time, details such as undercuts and reserve steps are accurately reproduced to match the mold.

LIQUID TO SOLID: To obtain a uniform nylon formulation, the catalyst must be thoroughly agitated. The mobile liquid flows into all mold cavities. Then it becomes a solid without forming any vacuum bubbles.

COMPLEX SHAPES: Large and complex cast-nylon shapes are made in a matter of minutes. The variety of parts shown demonstrates the versatility of the process. No pressure is used during the casting cycle.

How Easily Can You Join Metals By Resistance Spotwelding?

By **R. D. Enquist**—Member of the Technical Staff, Components and Materials Lab., Hughes Aircraft Co., Culver City, Calif.

Knowledge of the metallurgy involved in spotwelding is a big help to production plans.

A simple formula reveals the relative ease by which various metals can be joined.

■ The boom in electronics shows little sign of slowing down. Metalworking tools play quite a role in this industry. Much of the success in fabrication rests in the hands of resistance spotwelding. Many metals can be joined very easily by this method. A few are difficult. But which metals can be spotwelded more easily than others?

You can classify the metals into four main groups. The metals within each group have similar properties. The groups include ferrous metals, light metals, high conductivity and noble metals, and refractory metals.

With all of these metals, ease of welding is controlled largely by three main factors. They are resistivity, thermal conductivity and melting point.

Obvious Clues—Any metal with a very low resistance to current flow could be expected to be hard to weld due to the very nature of the process itself. A metal with high thermal conductivity could also be troublesome. The reason, of course, is that such a metal would dissipate welding heat to a great extent.

A refractory metal, due to its high melting point, would also be hard to weld. Much more energy would be needed to make the weld.

All three properties can be combined into a useful formula. From this simple formula, you can get a good idea just how easily certain metals can be welded. Here's the formula:

$$W = \frac{R}{FK_t} \times 100$$

W = weldability
R = resistivity
F = melting point
K_t = thermal conductivity

A weldability figure below 0.25 is a poor rating. Between 0.25 and 0.75, weldability is fair. It becomes good between 0.75 and 2.0. Anything above 2.0 is a sign of excellent weldability.

At a Glance — Both tables display the full range of these ratings. The first table delves into several basic metals, while the second table includes certain commercial alloys.

The ratings are fairly consistent with practical experience. The first table implies that the ferrous group is easy to spot weld. Ratings for the light metals indicate that this class is also weldable, although somewhat more difficult than the ferrous group.

The ratings for the highly conductive metals, copper and silver, are poor. If you have ever tried to spot weld these metals, then you know they are notoriously hard to join. For reasons not shown in the

WELDING IN MINIATURE: Production welds of nickel ribbon to Kovar header posts are made using special power supply and welding head.

Check Weldability of Basic Metal Groups

Category	Metal	Resistivity	Melting Point, °C	Thermal Conductivity	Weldability
Ferrous Metals	Iron	9.71	1539	0.18	3.51
	Cobalt	6.24	1495	0.165	2.46
	Nickel	6.84	1455	0.22	2.15
Light Metals	Aluminum	2.655	660	0.53	0.76
	Magnesium	4.46	650	0.38	1.80
Conductive and Noble Metals	Copper	1.673	1083	0.94	0.16
	Silver	1.59	960	1.0	0.17
	Gold	2.19	1063	0.71	0.29
	Platinum	9.83	1773	0.17	3.26
	Palladium	10.8	1554	0.17	4.10
Refractory Metals	Molybdenum	5.17	2625	0.35	0.56
	Tungsten	5.5	3410	0.48	0.34
	Tantalum	12.4	2996	0.13	3.19

(All properties stated in cgs units.)

rating system, gold is more weldable than the index shows.

Own Set of Rules—The refractory metals can be welded as long as you follow special practices. Keeping this point in mind, they seem to be in the proper place on the weldability scale.

An interesting insight into the problems of welding copper-base alloys is evident in the second table. As the zinc content of brasses increases from 5 pct in Gilding metal to 40 pct in Muntz metal, the weldability moves from fair to good. The effect of tin, phosphorus, aluminum, silicon and manganese is striking on copper-base alloys.

The most simple mode of resistance spotwelding is the fusion method. Here, of course, metal at the joint to be welded is heated until it melts locally. The molten pool is confined until it solidifies into a cast nugget.

Dissimilar metals can be welded by this method as easily as like metals, providing there's little difference between their melting points, vapor pressures and other thermal and physical traits.

Our Vacuum Tube Products Div. in Oceanside, Cailf., specializes in building spot-welding equipment

How Common Alloys Are Rated

Alloy	Resistivity	Melting Point, °C	Thermal Conductivity	Weldability
AISI C-1020 Steel	15.9	1430	0.11	10.11
Austenitic Stainless Steel	27.6	1415	0.052	37.4
Titanium	45	1725	0.05	52.17
Gilding Brass (95 pct Cu – 5 pct Zn)	2.98	1065	0.58	0.48
Muntz Metal (60 pct Cu – 40 pct Zn)	5.87	905	0.30	2.16
Phosphor Bronze (95 pct Cu – 5 pct Sn-P)	8.78	1050	0.21	3.96
Phosphor Bronze (90 pct Cu – 10 pct Sn-P)	16.65	1000	0.18	9.28
Silicon Bronze-Everdur (96 pct Cu – 3 pct Si – 1 pct Mn)	25.64	1019	0.08	31.6
Aluminum Bronze (95 pct Cu – 5 pct Al)	9.81	1065	0.19	4.84
1100 Aluminum Alloy (0 temper)	2.836	657	0.53	0.81
2024 Aluminum (0 temper)	3.346	638	0.46	1.14
2024 Aluminum Alloy (T6 temper)	4.402	638	0.35	1.97
7075 Aluminum Alloy (T6 temper)	5.069	638	0.31	2.56

(All properties stated in cgs units.)

NICKEL FUSION: Weld made in 0.010-in. thick nickel shows sharply defined nugget within the confines of the parent stock. (100 X).

FORGE WELDING: Weld in 0.003-in. copper was made by forge-welding method. Note how metals have recrystallized. (400 X).

for joining small metal parts. We have used this equipment with good success.

We've joined a 5-mil Chromel-Alumel thermocouple to a 1 16-in. sheet of 4130 steel. Another successfully welded example is 1-mil thermistor leads joined to 10-mil diam nickel wire.

Cast Nuggets—Sometimes, welds between dissimilar metals will form alloy nuggets. Then again, the welds may be mechanical mixtures. Most steels, nickel alloys, light metals and some of the brasses are welded by this method.

The other mechanism in resistance is "forge welding." It consists of heating the metals to be joined until they become plastic. They are then forced together by applying pressure to the area to be welded. What happens is that the atoms of the two metals have been forced so close together that they become a single piece of metal.

Spot welds containing fused nuggets are felt to be more reliable than forge-welded joints. The fusion method is more tolerant to changes in temperature, follow-through pressure and the surface cleanliness of the base metals.

A Clean Surface — Another factor is surface preparation. Take aluminum, for example. Unless this metal is cleaned within 24-48 hours prior to welding, you might as well expect trouble. A layer of oxide will build up on the metal's surface. This layer, acting as an insulator, prevents the passage of electrical current.

Steel is another matter. It has such a high tolerance for surface dirt that it can be welded easily even if mildly rusty. Of course, this isn't a recommended procedure. Nickel and its alloys must be degreased to protect them from sulphur contamination during spot-welding.

Thorough cleaning is also needed for copper and copper-base alloys to prevent arcing, pitting and sticking to the welding electrodes.

In welding dissimilar metals, melting points and vapor pressures should be about the same. If one metal has a very high vapor pressure at the melting point of the other, metal expulsion problems are apt to occur.

Into Solution—Whether dissimilar metals will form solid-solution alloys depends upon two factors. One is atomic diameter and the other is the tendency of the metals to form compounds.

If the atomic diameter of the metal taken into solid solution doesn't differ from that of the other metal by more than 14 pct, chances are good that a solid-solution alloy will form. When the metals have a strong affinity for one another, however, they will form intermetallic compounds.

Weldability of clad metals may be a direct function of the cladding metal or of the base metal. It depends upon the thickness of the cladding. In the electronics industry, the common cladding metals are gold, nickel, tin, copper and lead-tin solder alloys.

Gold cladding is applied as a very thin electroplated deposit to protect base-metal lead wires against corrosion. This combination helps to improve the weldability of Kovar transistor lead wires.

Better Soldering—Nickel, tin and lead-tin solder coatings are often applied to copper lead wires to improve solderability. These alloys are fairly thick. As such, they affect the weldability of the metal they are coating.

Tin and lead-tin solder alloys vaporize during welding. The vapor sublimes on the electrodes, making them dirty in a short time. Careful maintenance of the electrodes is a must.

Copper is often used as a cladding for ferrous base metals. You would think that copper might hinder weldability, but the traits of the base metal often prevail.

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DOUBLE POUR: Molten metal is poured from induction furnace to pouring furnace into a disintegrator.

Atomizing Shapes Future For Powdered Metals

Powdered metals are set to probe new markets.

A new invention produces small-quantity lots by atomizing pre-alloyed metal into powder.

■ Research paid off double at Vanadium-Alloys Steel Co., Latrobe, Pa. An experimental program paved the way to a new patent for improved production facilities in the powder metallurgy department. At the same time, the program makes possible the making of higher quality pre-alloyed metal powders.

The research project to improve the pre-alloying process was started in 1956 by W. L. Batten, department manager. It resulted in a patent which covers the design of equipment and apparatus to atomize molten metal into powder particles.

Steps Up Efficiency—Referring to his invention, Mr. Batten says, "The invention steps up manufacturing efficiency through better control of atomizing conditions." He explains that the high-quality powders, produced by the new equipment, have less surface oxide, better green strength, and a more desirable shape for molding into structural parts. The new apparatus assures increased control of powder particle shape and quality.

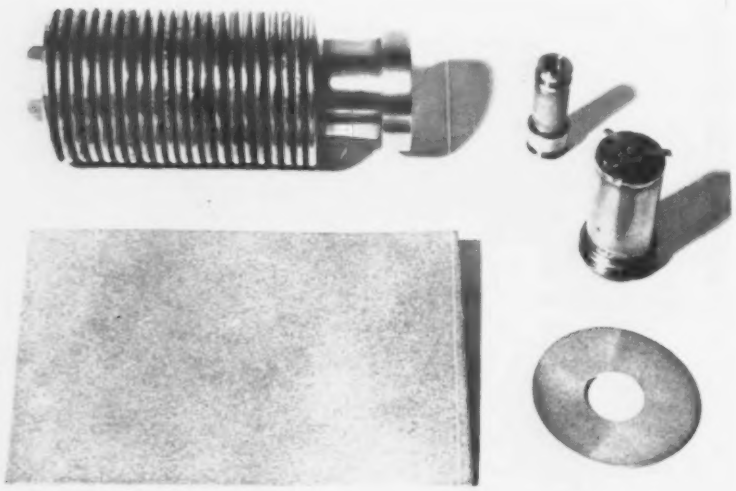
Dr. G. A. Roberts, vice president of technology, who directed the project, points out that the improved atomizer design enables Vanadium-Alloys to broaden its powder production. The new invention works well on either small, experimental runs or large production orders. This aids the probe of new market areas.

Vanadium-Alloys first became interested in powder metallurgy shortly after World War II, and began marketing pre-alloyed stainless and alloy powders in 1949. The process, used by the tool and special steel producer, manufactures powder direct from molten metal. Thus, each and every particle contains the exact analysis as the original composition.

Well-Mixed Powder — Because alloy conditions are made in the melt, parts fabricated from pre-alloyed powders are completely homogenous. The powders have the properties of the same analysis in bar or cast form—within the limitations of density.

Experience shows that properties of pre-alloyed powder compacts are consistently better than properties of compacts made by mixing primary powders, according to Vanadium-Alloys. In addition,

TYPICAL SHAPES: Representative parts made from Vasco stainless steel and pre-alloyed powders. Parts withstand heats from –420° to 1500°F.



POROUS FILTERS: Sintered stainless steel sheet can be blanked, formed and welded. Filters of many shapes are easily made by the process.

the greater uniformity of alloy distribution means better control of density in pressing, and size change in sintering.

Many Uses—Alloy powders are also made for electrical and magnetic applications and for brazing and hard-facing. For instance, Vasco 50 (50-pct Ni-Fe) powder has been processed into relay-pole pieces with no loss in electrical properties. Pre-alloyed powder is used because parts made from mixtures of nickel and iron powder lack the necessary permeability.

Another important application is porous metal filters. Stainless steel types 316, 347, and 310 are used, depending on the severity of conditions. In extreme situations, which call for resistance to both corrosion and oxidation, nickel- and cobalt-base, high-temperature alloy powders are useful.

Filters made of pre-alloyed powders are used for many jobs in the chemical, petroleum, nuclear, pharmaceutical and aeronautical industries. The special porous filters feature tensile strengths as high as 20,000 psi with 5-10 pct elongation.

Performs Well—The sintered filters withstand pressure differentials ranging from a commercial vacuum to 6000 psi. Reverse flushing or the use of nitric-acid solutions make possible in-service cleaning. The filters can withstand temperatures from –420° to 1500°F.

Improved pre-alloyed powders are presently used for several new powder metallurgy applications. One of these is high-energy impact forming. Here, a shock wave compacts particles in the production of large shapes and problem parts. With this method, high-density green compacts can be made from relatively incompressible powders.

Powders offer interesting nuclear applications. Silver - indium - cadmium powders with controlled amounts of oxidation have been formed commercially into nuclear furnace control rods. Tests show no radiation damage. Tensile and creep strengths exceed those possible with the wrought alloys.

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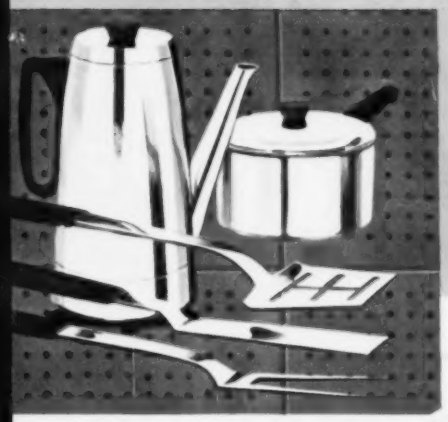
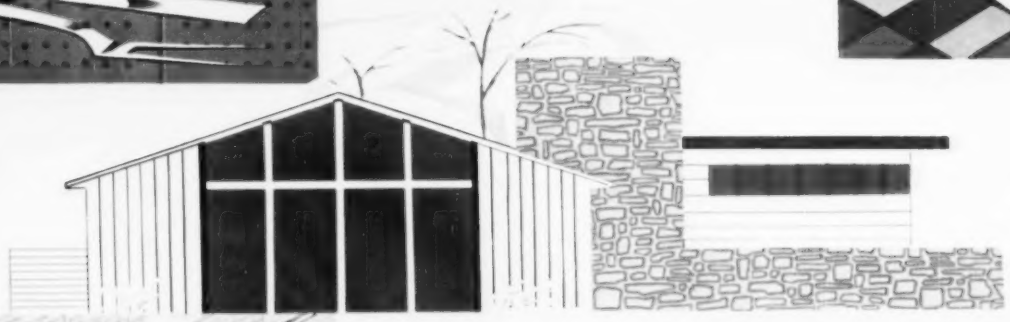
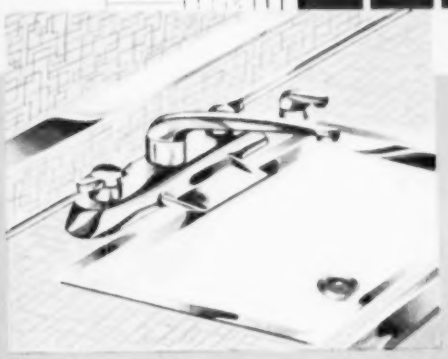
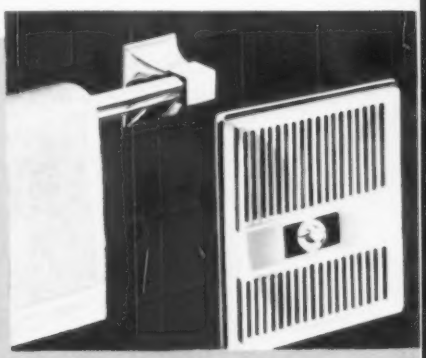
for every stainless reason!









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P.S. For further help in writing John's answer, send for the new Amweld products catalog. Or if you have something more specific in mind, don't hesitate to send your specifications, a blueprint, or a sketch, so Amweld can quote for your cost evaluation!

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In describing a 400-cycle, induction-heating unit, a newly-released folder tells how the new machine simplifies preheating and stress relieving of arc-welded pipe joints. Automatic operation, by means of a strip-chart program controller, is the key to the process. (Hobart Brothers Co.)

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The Scranton Chamber of Commerce has just produced a 30-page, four-color brochure illustrating and describing the Scranton area. In it, photographs and charts show Scranton's relationship to the world's richest markets.

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This 20-page bulletin presents complete specs and illustrates construction features, operation and optional equipment for a new line of universal milling machines. (Brown & Sharp Mfg. Co.)

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FREE LITERATURE

an overcoat of newly-developed epoxy cement. When subjected to the heating cycle, this cement surface softens just enough to form an extra-strong bond to the adjacent wires. Thus, coils maintain their shape without ties or braces at up to 200°C. (Anaconda Wire and Cable Co.)

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Holding Power

Threaded fasteners are the subject of a new four-page folder. In easy-to-read picture sequence, the literature illustrates four simple steps which assure maximum clamping force. This eliminates failures caused by sub-standard tightening. (Skidmore-Wilhelm Mfg. Co.)

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Free Engineering

Industrial truck users can cut costs by taking advantage of a special, free-engineering service. At least the Elwell-Parker Electric Co. thinks so. They're offering a two-color brochure that shows a dozen examples of production problems solved by special handling equipment. This equipment was recommended through a free engineering service provided by that company.

For free copy circle No. 11 on postcard

Aids the Gasket User

Information concerning various styles of gasket materials is presented in a new brochure. It contains a wealth of material to help the gasket user select and specify the right gasket material. (Garlock Inc.)

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Blast-Furnace Aid

How can one man tap a blast furnace? The answer is contained in a glossy folder that gives all the details on an automatic furnace-tapping drill. The unit consists of air-operated percussion drill on a flexible air-hydraulic mounting. (Ingersoll-Rand Co.)

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Low-Cost Counter

Simple and low in cost, a new general-purpose electronic counter is described and illustrated in a new-product bulletin. The publication tells how these counters aid in the tabulation and control of any series of discrete units. (Veeder-Root Inc.)

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Fasteners Story

To tell the story of industrial fasteners, here's a colorfully-illustrated, 25-page booklet. Included is a two-page flow chart outlining the manufacture of a fastener from steel billet to bolt. Other sections are devoted to an impressive 10-in. continuous billet mill, heat-treating facilities, and application of several protective coatings by various methods. (Bethlehem Steel Co.)

For free copy circle No. 15 on postcard

Premium Lubricants

An all new 20-page, plastic-bound booklet relates the details about premium lubricants. It offers a valuable collection of data on the basic concept of molybdenum-disulfide additives. These formulations enhance the temperature capabilities of lubricants. (Hercules Packing Corp.)

For free copy circle No. 16 on postcard

Liquid Loader

In 28 pages, a new liquid-loader catalog fully illustrates and outlines the seven basic types of liquid loaders. These are: Slide sleeve, long range, scissors arm with valve inboard, scissors arm with valve outboard, single arm, utility, or bottom loading. (OPW-Jordan Corp.)

For free copy circle No. 17 on postcard

Automatic Strappers

New product literature is available on automatic steel-strapping machines. Strappers team up with power conveying and automatic controls. This provides a completely-automated packaging operation for reinforcing and bundling all types of shipping containers. (Inland Wire Products Co.)

For free copy circle No. 18 on postcard

Defends Steel Imports

In a recently-released publication, "The Truth About Imports—Part II," the United States-Japan Trade Council views claims of injury by imports. This pamphlet, the second in a series, discusses the pleas of certain domestic industries for relief from import competition.

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NEW PATENTS

Upgrades Open Hearth

Improvements in openhearth furnaces, A. Jackson (assigned to United Steel Companies Ltd., Sheffield, Yorks, England), Apr. 12, 1961. An openhearth furnace is provided with two, fixed, slag pockets at each end. While one is being cleaned out, the other can be brought into use. British 864,947.

Sintering Apparatus

Method and apparatus for suction-draft sintering, K. Meyer (assigned to Dravo Corp.), June 30, 1961. This patent covers a method and apparatus for uniformly sintering mixtures of iron ore and coke across the width of the belt. It avoids the effect of shrinkage or contraction which takes place during the sintering operation. U. S. 2,989,395.

Conveying Method

Method of conveying green pelletized material, K. Meyer (assigned to Dravo Corp.), June 20, 1961. Patent protects a method and apparatus for conveying green iron-oxide ore pellets from the pelletizer to the sintering machine. The pellets are compacted and strengthened, loose material is picked up, and broken pieces are screened out. U. S. 2,988,781.

Magnetic Alloy

Sintered magnetic alloy and methods of production, E. Adams and W. M. Hubbard (assigned to U. S. Sec. of the Navy), June 20, 1961. In the manufacture of a sintered compact containing 4-9 pct Al, 6-12 pct Si, and the remainder essentially all Fe, the metal powders are admixed. Then the mixture is heated to at least 1000°C in an inert atmosphere. U. S. 2,988,806.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.

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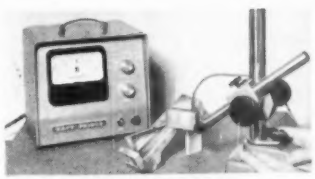
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TPI-1

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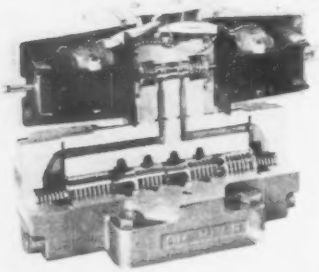
New Materials and Components

Partial Automation Boosts Machine-Tool Output

On certain jobs, full numerical control of machine tools just doesn't pay. But often, some degree of automation would enhance the operation. Plugging the gap between manual control and whole-hog numerical setups is a new position-display unit. It teams up with a position transducer that's geared to the leadscrews. As the transducer senses magnitude and direction of motion, a decimal counter displays the information. This system lets the operator position the machine fast and accurately. (Rheem Mfg. Co.)

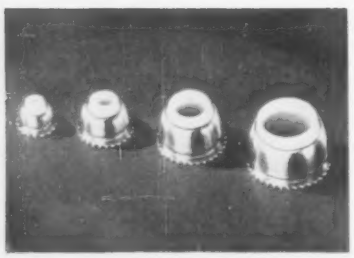
For more data circle No. 20 on postcard, p. 83



Piggyback Control Valves Slash Piping Needs

New, piggyback, four-way control valves suit a wide variety of applications. They're naturals where pressures don't exceed 3000 psi. One unusual highlight of the series is an internal drain. This eliminates the external-drain line. It also obviates the need for a fifth port. As a result, most systems use less piping with the new valves on the job. Another interesting feature is a flow-control manifold. It lets you meter the speed of fluid motors and single- or double-acting cylinders. Also available are pilot-choke adjustments and spool-stroke adjustments. However, these are optional items. (Racine Hydraulics & Machinery, Inc.)

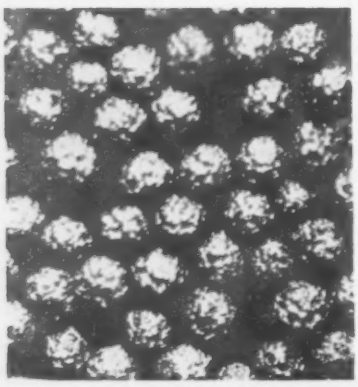
For more data circle No. 21 on postcard, p. 83



Self-Aligning Bearing Centers in the Hole

Here's a new bearing that mounts in 0.040-in. or heavier sheet metal, by means of a self-clinching retainer. It centers in the hole, clinches tightly and resist torque. No bosses or other special provisions are necessary. Made of Delrin, the bearings slip into retainers of steel, aluminum or stainless steel. The aluminum retainers mount in materials with Rb 50 hardness or less. Steel types suit up to Rb 70 hardness. (Spyraflo, Inc.)

For more data circle No. 22 on postcard, p. 83



Closely-Screened Nickel Powders Fight Corrosion

High-purity, closely-screened nickel powders are now commercially available with reduced sizing-premium charges. Perfection of a product-distribution technique led to the price reduction. This technique is the fruition of several year's development. The company's SF (Screened Fraction) nickel powders can be supplied in eight size groups. These range from —50 +100 mesh to —500 mesh. Each group comes in lots of 10, 100, and 500 and 2000 lb. In use, SF nickel powders fill the bill for porous structures where corrosion resistance is a must. This includes devices used for filtering both liquids and gases. The powders also look good for fuel-cell electrode applications, especially hydrogen-oxygen fuel cells that use a potassium-hydroxide electrolyte. (Sherritt Gordon Mines Ltd.)

For more data circle No. 23 on postcard, p. 83

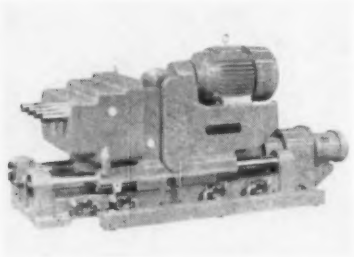
Upgrades Appearance

A sparkling new finish gives a decorative brushed-metal appearance to electro-coated strip steel. It offers manufacturers and product designers reduced finishing costs and improved sales appeal. The new finish is available in base steel of all carbon and temper ranges in thicknesses from 0.050-0.008 in. and in widths to 22 in. It fabricates easily. In fact, in mild forming operations, it's as convenient to handle as mild steel. There's no distortion of the brush-finish design. (Pittsburgh Steel Co.)

For more data circle No. 24 on postcard, p. 83

Lead-Screw Feed

Positive-feed electromechanical lead-screw units have been designed for boring, drilling, reaming, counterboring, spotfacing, chamfering, milling and trepanning. A recirculating ball-type feed mechanism promises both higher production rates and decreased maintenance, as well as improved product quality. There are no delicate or complex components to wear out or break. Accurate, positive feed is provided. It's designed to feed against a positive stop and provide adjustable tool dwell. (The Foote-Burt Co.)



For more data circle No. 25 on postcard, p. 83

Pumps and Motors

Here's a new line of angle-type piston pumps and motors rated for pressures to 5000 psi. A wide variety of controls, instant response to the controlling signal, and reversible flow suit the units for almost any application requiring high pressures and flows. Just a partial list includes forming and extrusion presses, cargo winches, planer drives and log car-

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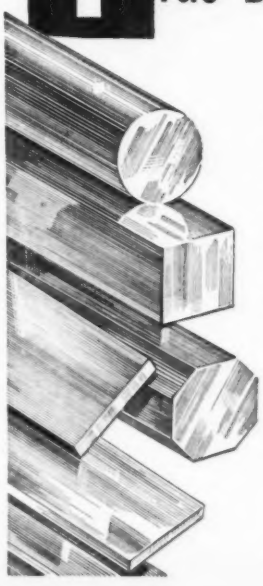

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WYCKOFF STEEL PRODUCTS • Carbon, Alloy and Leaded Steels • Turned and Polished Shafting • Turned and Ground Shafting • Large Squares • Wide Flats up to 12¾" x 2¼" and 14" x 1¼" • All types of Furnace Treated Steels including Carbon Corrected Steels

WELD WITH ARCOS STAINLESS ELECTRODES

Job report courtesy of Southwest Welding & Mfg. Div., Yuba Consolidated Industries, Inc. Alhambra, California

World's largest liquid oxygen tank calls for pioneering in stainless welding. This 75,000 gallon vacuum bottle for liquid oxygen was fabricated from Type 321 stainless. Specifications required strong sound welds having maximum notch toughness at low temperatures. After extensive impact testing at minus 320°F Arcos electrodes, designed for low carbon and specific ferrite ranges, were selected. The precise weld metal properties delivered by Arcos on this job are available for all your stainless welding jobs.

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riages. The newcomers are available as either pumps or motors, with fixed or variable displacement. With servo control, the variable-displacement pump strokes from maximum displacement in one direction to full opposite in about ½ second. Thus, the output flow exactly follows the controlling signal. (Vickers Inc., a div. of Sperry Rand Corp.)

For more data circle No. 26 on postcard, p. 83

Special Adhesive

Mirror-like qualities of a new reflective metal sheet are produced by bonding metallized polyester film to aluminum. A high strength rubber based adhesive provides the permanent bond. Called "Dynasyl," the metal sheet can be fabricated in a number of ways for a wide variety of uses. For instance, the material should make excellent

reflectors for lighting systems. (The Good Year Tire and Rubber Co.)

For more data circle No. 27 on postcard, p. 83

Aluminum Alloy

A new alloy broadens the use of aluminum castings. It's a high-strength, shock-resistant casting alloy, developed for use where high yield strength and low elongation are needed. The alloy comes in two grades, to accommodate different conditions. One, as-cast and fully-aged, has a yield strength of 36,000 psi with some shock resistance. Solution heat treated and aged in the T6 condition, it boasts a yield strength well over 40,000 psi and over 5-pct elongation. The other

has an as-cast, fully-aged yield strength of 32,000 psi. At the same time, it has 7-pct elongation. Thus, it combines strength with great shock resistance. (William F. Jobbins, Inc.)

For more data circle No. 28 on postcard, p. 83

Small Gear Clamps

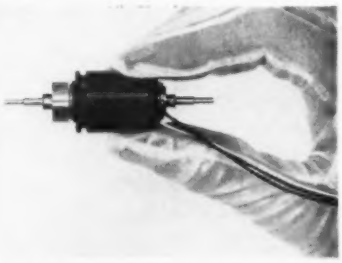
More than 150 different types are available in a line of instrument

clamps for the electro-mechanical equipment industry. These clamps are manufactured to precision tolerances of ±0.001. They're available in shaft sizes of ⅛, ¼, 3/16, and 5/16 in. (Siamco Div., Tech-Ohm Electronics, Inc.)

For more data circle No. 29 on postcard, p. 83

Slow-Speed Drive

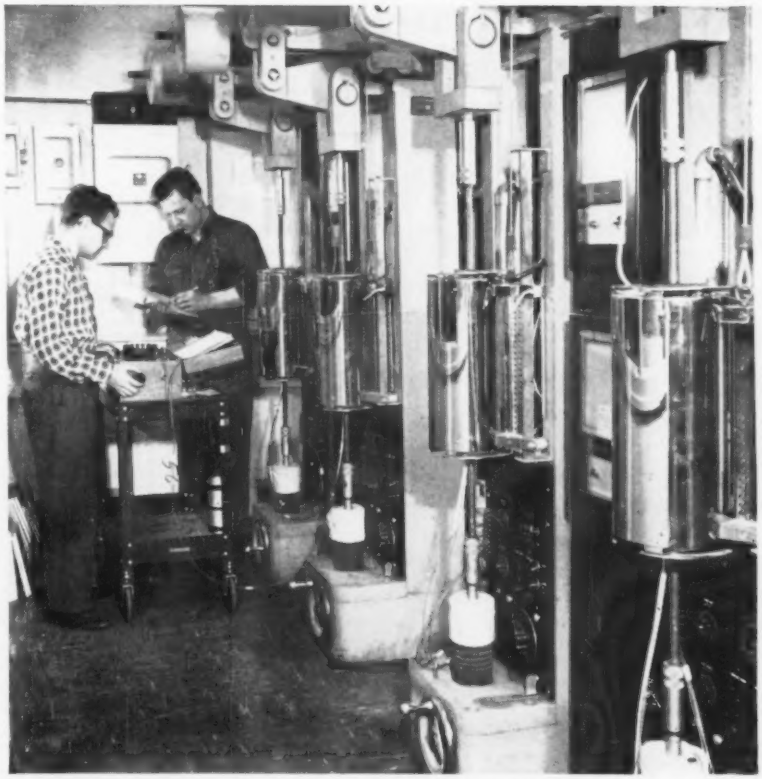
A new, miniaturized, slow-speed drive serves light-duty applications such as potentiometers, slip rings and synchros. It's not a substitute for conventional gear-head motors because of backlash and limited torque output. However, the slow-speed drive has the advantages of smooth operation, high-shock capacity under vibration and extreme compactness. The drive - motor



speed reducers are made on order with size 10, 11, or 12 motors. Single or double-ended shaft output is another option. (The Barden Corp.)

For more data circle No. 30 on postcard, p. 83

BETTER WELDING THROUGH ARCOS RESEARCH



Arcos technicians check temperature of weld specimens in stress rupture laboratory.

Arcos research and development keep Arcos ahead in today's fast-changing technology. Demands for higher strengths, lighter weights, superior properties, along with lower costs require constant study of materials and techniques. Full time Arcos research is aimed at developing better filler metals and improved methods of applying them. Search . . . formulate . . . test . . . this continual activity means high quality dependable performance when you weld with Arcos.

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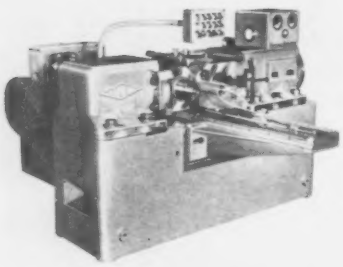
New Equipment and Machinery

Dual-Purpose Machine Speeds Metal-Plate Cutting

This new plate-cutting machine handles both ferrous and non-ferrous metals. When it's set up to cut non-ferrous, the cutting head is locked in position. Then, at variable speed, its carbide-tipped wheel traverses the width of the bed. The machine cuts 4-in. aluminum plate at 4 fpm, or even faster rates. For ferrous or steel alloys, the head is unlocked. This lets the oscillating abrasive wheel sense its way through the cut. Cutting rate is as high as three seconds per sq in. (Wallace Supplies Mfg. Co.)

For more data circle No. 31 on postcard, p. 83



Thread-Rolling and Forming Unit Tackles Big Jobs

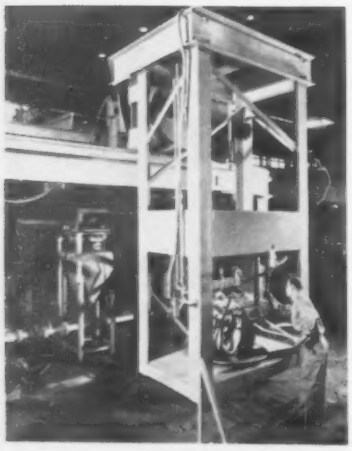
Designed for the heaviest thread-, form, spline- and gear-rolling jobs, a new machine provides rolling forces up to 100 tons. Nominal diametrical capacity is from 0-6 in. maximum for infeed rolling; from 0.4 in. maximum diameter for through-feed rolling. Electronically-controlled infeed cycling and variable infeed-stroke length makes the machine very versatile. The major bed is a 3-in. steel plate. It provides great mechanical stability. Summing up, the unit offers power, rigidity and speed for top efficiency within its rated loading capacity. (The Landis Machine Co.)

For more data circle No. 32 on postcard, p. 83

Control System Positions Gaging Machine

A new precision-measuring machine has a five-axis configuration which gages inside and outside contours accurately, rapidly and simultaneously. Electronic resolution is 0.000010 in. on each of four linear motions, and 0.36° on one rotary motion. Key to this accuracy is a special tape-control system. It furnishes electrical signals that position measuring probes to the specified dimensions. Two other probes measure deviation between these specified positions and the part being gaged. (The Bendix Corp.)

For more data circle No. 33 on postcard, p. 83



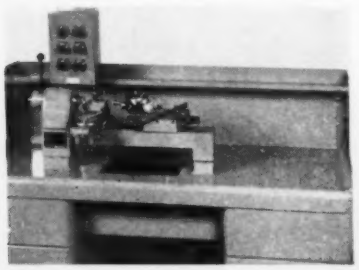
Handling System Aids Open-Hearth Steelmaking

Here's an advance that helps speed the open-hearth steelmaking process. It's a pneumatic system for handling dolomite, lime and ore. The manufacturer feels it is the first major change in placing dolomite and handling other materials in the last 25 years. The complete system uses centralized off-the-floor storage bins, blowers and activators at the lower-furnace level, pneumatic delivery to a cyclone receiver, overhead monorails, batch hoppers, and a mechanical thrower to place the refractory material onto the furnace walls. Dolomite, itself, is a carbonate of lime and magnesia in granular form. It rebuilds eroded backwalls and bottoms which may occur in the furnace lining during a heat. There are two big advantages to the new system. It clears the charging floor of material and handling equipment. It also frees hot-metal cranes for other vital functions in different areas of the plant. (The Blaw-Knox Co.)

For more data circle No. 34 on postcard, p. 83

Advanced Lathe

By pushbutton operation, speeds from 300-3500 rpm are available on a precision lathe. A 1:1 pulley ratio teamed up with a new electronic motor drive provides the key to this performance. With a 2:1 pulley jump, 600-7000 rpm are possible. The drive can be jogged and reversed by turning a switch on the



up-to-date control station. It also has dynamic braking and it will not slow down with an increase in load. A voltage-drop compensator keeps the motor at constant speed. The lathe itself features a double-compound slide rest, screw tailstock and steel cabinet. A two-speed motor and drive is also available. (F. W. Derbyshire, Inc.)

For more data circle No. 35 on postcard, p. 83

Potentiometer Trio

Three new, low-cost, portable potentiometers have recently been announced. These instruments provide on-the-spot temperature measurements for instrument maintenance departments. The units are also right at home with testing and research work. A single-range and a double-range potentiometer both indicate temperatures directly in degrees F in any of 15 temperature ranges. The third unit, a double-range, millivolt potentiometer, is calibrated for emf measurements on two ranges, 0-22 and 20-64. It has a manual, reference-junction compensation dial. Thus, it provides a source of calibrated voltage for checking other potentiometer-type instruments. All three instruments boast a basic accuracy of ±0.3 pct of their range. Designed to withstand rugged operation, they are compact in size—only 7 x 6 x 5 in. —and they weigh only 4½ lb. Each is housed in a sturdy metal case with a durable gray-vinyl finish. (Leeds & Northrup Co.)

For more data circle No. 36 on postcard, p. 83

"Remembers" Torque

For mechanical checks of stress, strain, thrust, tension and compression, this new torque wrench records the peak reading. In a typical situation, the receiving - inspection department of a firm purchasing

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Republic ELECTRUNITE Special Smooth I.D. Hydraulic Cylinder Tubing

the tubing that can often be delivered as a finished part

Precision controlled wall thickness with uniform concentricity makes ELECTRUNITE Special Smooth I. D. a finished part ready for use without machining in many hydraulic applications.

Because you can order ELECTRUNITE in exacting wall thicknesses, there's no need to pay for extra metal which may ultimately be machined away.

Only selected quality flat rolled steel is used in making ELECTRUNITE Special Smooth I.D. Hydraulic Cylinder Tubing. Thickness of this steel is precisely controlled in rolling, assuring uniform wall thickness of the finished tubing.

All tubing is welded by the exclusive ELECTRUNITE process *without addition of extra metal*, assuring that the weld area is of the same chemistry as the rest of the tube. In the processing, lengths of tubing are normalized in a controlled atmosphere furnace, completely recrystallizing the weld area to provide a uniformly ductile tube.

Tubing is drawn through a ring die and over a highly polished mandrel, attaining exacting I.D. and O.D. tolerances as well as a dense I.D. surface finish.

Standard I.D. tolerances are closer than those shown for tubing made by other processes. When necessary, tolerances can be maintained to 50% closer than standard.

For full information on Republic ELECTRUNITE Special Smooth I.D. Hydraulic Cylinder Tubing, Republic Hydraulic Fluid Line and Mechanical Tubing contact your Republic representative or write direct.

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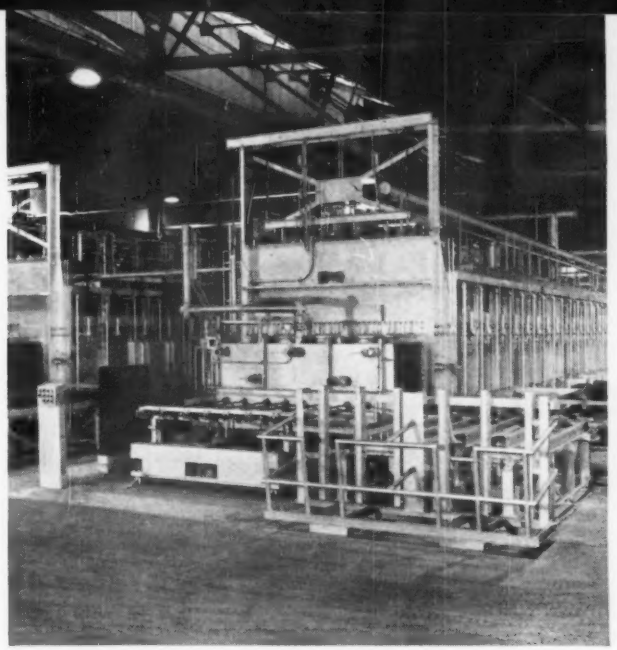
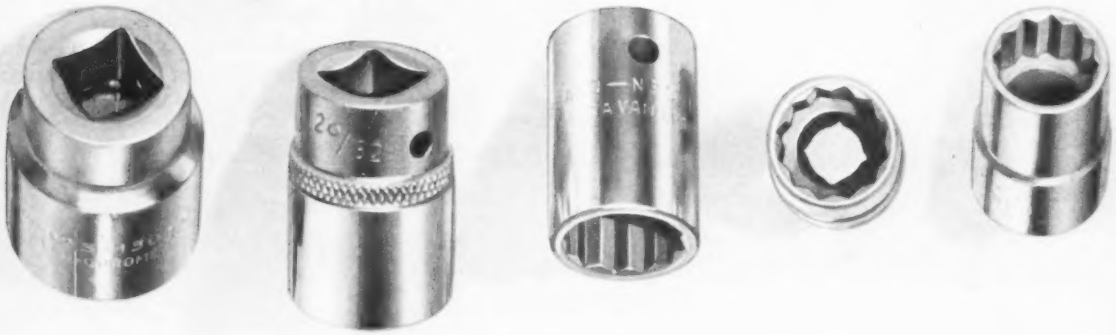


STEEL FOR COLD EXTRUSION, supplied in heavier coils weighing up to 1600 pounds is produced in Republic's New 11″ Chicago Bar Mill. Atmosphere controlled continuous annealing furnaces can anneal, normalize, or spheroidize to your precise requirements. The cold extrusion process virtually eliminates raw waste material. Standard equipment may be available to minimize your re-tooling costs. Mail coupon for data.



WRENCH SOCKETS, made by Herbrand Division of The Bingham-Herbrand Corporation, Fremont, Ohio, illustrate the kind of application where the superior strength, toughness, and machinability of *Republic Cold Finished Alloy Bars* help produce a better product at lower cost.

Bars are formed, drilled, and cut off in an automatic screw machine, then hot broached to shape internal dimensions. Final stages of socket production include heat treat and chrome plating. Mail coupon for more data on Republic Alloy Bars.

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REPUBLIC STEEL

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- ☐ ELECTRUNITE* Special Smooth I.D. Hydraulic Cylinder Tubing
- ☐ Republic Steel for Cold Extrusion
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- ☐ Republic Pig Iron and Foundry Service

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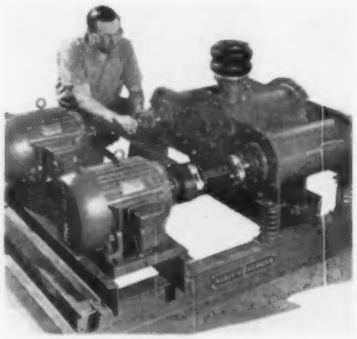
fasteners makes periodic determinations of the maximum torque which a nut, bolt or screw will take before its elastic limit is reached and the fastener suddenly yields or snaps. Since the test operator does not have to think back to where the reading was, at the moment of yield, tests with the new wrench are fast and accurate. As torque is exerted, the memory indicator moves along a track on the face of the scale. It remains at the maximum reading. (P. A. Sturtevant Co.)

For more data circle No. 37 on postcard, p. 83

Updated Vibratory Mill

Now, dual-drive, vibrating grinding mills feature easier maintenance. The vibrating mechanism has been taken out of the grinding chamber's interior. Its new position is adjacent to the chamber. This eliminates the need for bearings within the chamber. The re-arrangement increases user economy and maintenance accessibility. Also, since the

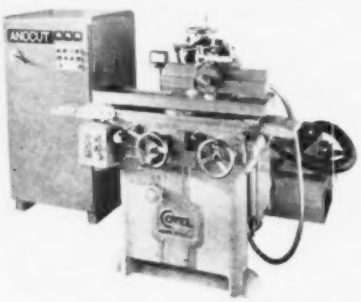


mill's vibrating mechanism is now completely enclosed, it no longer needs a circulating lubrication system. (Allis-Chalmers Mfg. Co.)

For more data circle No. 38 on postcard, p. 83

Electrolytic Grinder

An electrolic cutter and tool grinder has three distinct advantages over conventional carbide grinding. Faster grinding, longer diamond-wheel life and low-heat generation all lead to production savings. Also, the unit's spindle hood tilts 15° each way for setting clearance angles. This feature speeds setups for



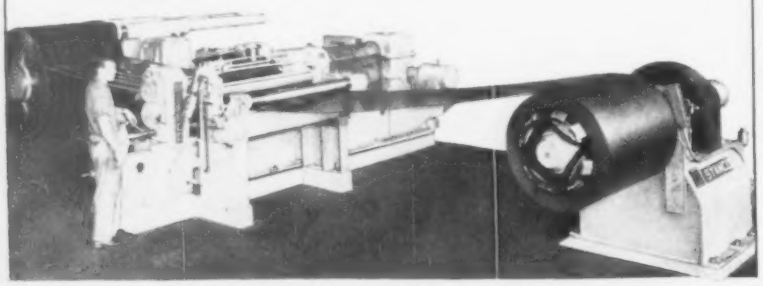
further savings. Another benefit is the fact that low heat means fewer cracks. (Covel Mfg. Co.)

For more data circle No. 39 on postcard, p. 83

Press Brake

Able to handle greater die lengths and widths, a new, 10-ft press brake develops 225 tons at or near the bottom of its stroke. The permanently widened, 36-in. die bed and ram provide adequate backup for large die sets. In addition, the double-plate bed has a shelf to

Stamco, *slitting and coiling line for coils of 20 thousand lbs. maximum weight, 52 inches maximum width.*



Stamco, a leader in slitting, coiling and shearing equipment, is in a position to furnish equipment to meet any requirement. Trained sales personnel will gladly consult with you. Write for details to:

Stamco Inc., New Bremen, Ohio, U.S.A.

- **slitting and coiling lines**
- **cut-to-length lines • continuous process lines**
- **power squaring shears • flying shear lines**
- **ferrous or non-ferrous mill equipment**

District Offices, Stamco Sales, Inc.

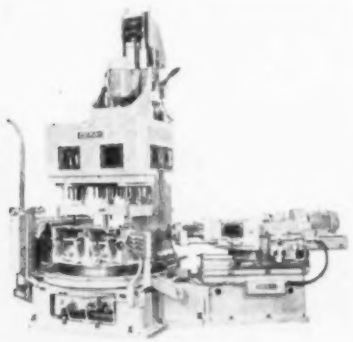
R. P. Popp, 18450 Livernois, Detroit 21, Michigan
R. P. Popp, 101 Investment Building, Pittsburgh 22, Pa.
I. W. Spraitzar, 159 Main Street, Chatham, New Jersey
W. E. Heineman, 122 West Burlington Ave., LaGrange, Illinois
W. H. Millan, 11955 Shaker Boulevard, Cleveland 20, Ohio

adapt die cushions for press applications requiring such units. Twelve-in. extensions at both ends increase the usable die length to 14 ft. Added features include remote control to the power-ram elevation, air counter-balances, tonnage load indicator, electro-magnetic brake on the arm adjusting motor and automatic ram stop at the top of stroke with a non-repeat feature and reversing control. (The Cincinnati Shaper Co.)

For more data circle No. 40 on postcard, p. 83

Drills and Reams

Slip-plate heads are a feature on a new 76-spindle drilling and reaming machine. The newcomer



drills and reams all holes in two different styles of power-shaft housings. External-housing dimensions are similar, but size and location of the holes differ from one housing to the other. Quick changeover between the two models is accomplished by shifting universal-joint assemblies within the slip - plate head. You change from one set of tool-carrier, slip spindles to another. Conversion takes only minutes. (The Foote-Burt Co.)

For more data circle No. 41 on postcard, p. 83

Research Aid

Offering a common work coil and two frequencies, a new generator provides research personnel with a tool to investigate the effects of frequency on zone refining. Its common, single-turn work coil instantly switches from 300 kilocycles to 7 megacycles. A saturable reactor gives output control. The generator itself rates at 15 kw for continuous duty at either frequency. It will serve in practically any induction-heating process. Proper shielding and arrangement of parts has eliminated any interaction between the output circuits. (Induction Heating Corp.)

For more data circle No. 42 on postcard, p. 83

Automatic Profiler

According to the manufacturer, an electronic, tracer-controlled profile-milling machine performs many classes of milling operations previously thought impossible for tracer-controlled machines. In other words, they say the hand profiler is obsolete. The new machine does automatic, continuous milling of simple or complex shapes from 2-dimensional master templates. In addition to normal tracer-controlled work, it handles many rectangular and square "pocket" - type cuts. (Pratt & Whitney Co., Inc.)

For more data circle No. 43 on postcard, p. 83

MILWAUKEE
WROT WASHERS

Away back yonder in the history of our 74-year-old company, long before inventory control became a science, the owners made it a policy to "have what they want when they want it."

Through the years, the Metalworking Industry has depended on *Wrought Washer* . . . the world's largest producer . . . for *Milwaukee Wrot Washers* of an infinite variety of shapes, sizes, types, materials and finishes. Diameters from 1/16 to 23 inches, thicknesses from .005 to 1 inch.

Having more than 129,000 sets of washer dies in our die storages also helps speed your orders. Often the "special" you need is a standard with us — or we can produce it to specifications in short order.

PURCHASING PERSONNEL . . . Free samples available. Request on your letterhead, mentioning types of washers your company uses most frequently. Or write for Washers and Stampings Catalog 40-B.

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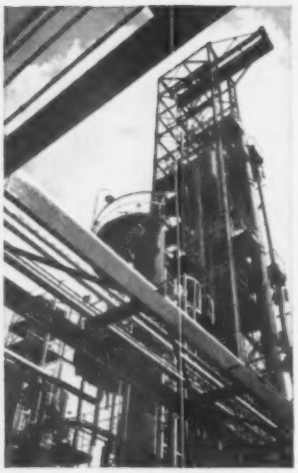
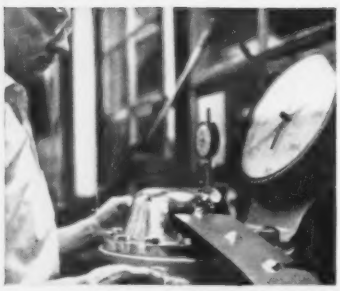
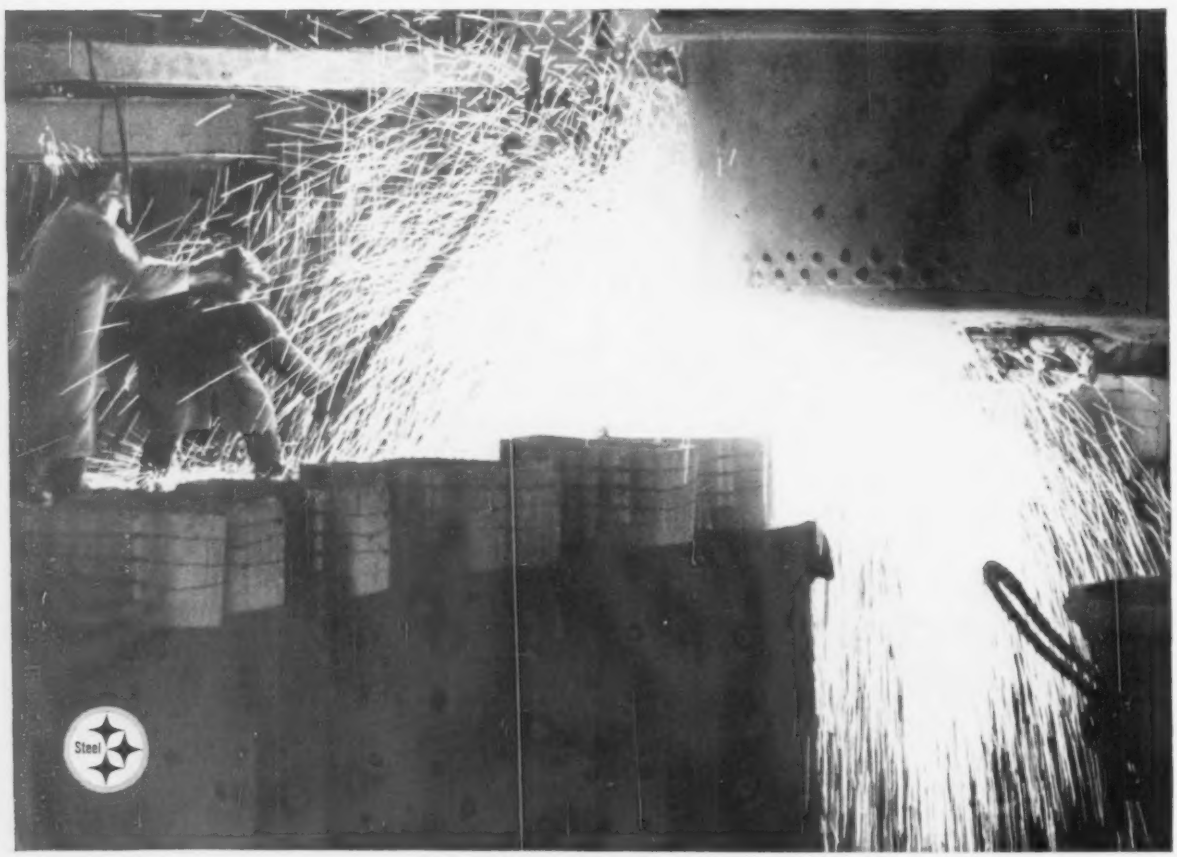




Alan Wood has several decided advantages to offer users of steel plate, sheet and strip. Capacity for quality quickly is one of them. Another is dependable product performance stemming from meticulous quality control. And our "immediate-attention-to-orders" policy adds still another *plus* when you do business with Alan Wood.



***that's* YOUR ADVANTAGE *at* ALAN WOOD STEEL COMPANY**

Conshohocken, Pa. • STEEL PRODUCERS WITH THE CUSTOMER IN MIND

DISTRICT OFFICES AND REPRESENTATIVES: Philadelphia • New York • Los Angeles • Boston • Atlanta • Cincinnati • Cleveland • Detroit • Houston • Pittsburgh • Richmond • St. Paul • San Francisco • Seattle • Montreal, Toronto and Vancouver, Canada: A. C. Leslie & Co., Ltd.

Fourth Quarter Demand Grows

Factors now coming into focus indicate a strong fourth quarter demand for steel is building up.

One prime reason: Automotive steel orders on the books are not enough to meet production schedules.

A sharp upturn in steel demand and production is in the making. Forces behind the demand are just coming into focus. But they have the potential of creating a sharp buildup in September-October and a sustained increase through the fourth quarter.

These factors are behind the strengthening demand:

1. Steel inventories are too low to sustain even a mild increase in business and will have to be built up.

2. Automotive demand for steel will increase sharply. Steel now on order for September is inadequate for the number of cars scheduled to be built.

3. The Berlin crisis will have an effect, both tangible and psychological.

4. Hedging against a price increase will be felt. Although this is not a major factor, it will come at a time when other market forces are strengthening.

5. At least some steel orders for this year will be based on fear of a steel strike in 1962.

October the Test—The real test of the market will not come until October. Then, the historical pattern of ordering as the market strengthens should take hold. This will result in a steady rise in orders and a tightening in deliveries by the end of October at the latest.

In the past ten days, a rush of new orders from a wide range of steel users has pulled August up to expectations. This is after some disappointments and delays which threatened to retard the expected recovery of the market in late summer.

General Recovery—The surge of new orders does not follow any particular pattern and varies widely among companies. General consumption is picking up; plants which were shut for vacations are opening; appliances are showing new strength on the basis of new 1962 lines; most of all, automotive is picking up.

In spite of the gains in auto steel ordering in recent days, orders now on the books for September delivery are short of what will be needed to meet production schedules for the month. Furthermore, the fourth quarter auto production schedules are shaping up as the best fourth quarter since 1955.

Auto Schedules — Auto production for the rest of 1961 now looks like this: August, 175,000 cars; September, 475,000; and an average of 600,000 cars in October-November-December for a 1.8 million fourth quarter. This would be the best fourth quarter since 1955's figure of 1,949,000 cars.

This, of course, is based on a "no strike" assumption. Although automakers deny current labor negotiations are affecting steel orders, the tonnage on the books indicates otherwise. This means that if a strike is avoided, automakers will plunge into the market for rush orders for September.

District Steel Production Indexes
1957-59=100

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	107	99	85	86
Buffalo	77	79	80	83
Pittsburgh	90	88	82	74
Youngstown	84	87	74	81
Cleveland	102	99	106	78
Detroit	102	96	125	114
Chicago	102	105	111	85
Cincinnati	109	116	105	80
St. Louis	115	110	80	68
Southern	108	105	105	91
Western	120	112	116	75
U. S. Index	99.3	97.6	95.5	82.5

Source: American Iron & Steel Institute

Steel Production, Composite Prices

Production	Last Week	Two Weeks Ago	To Date 1961	To Date 1960
(Net tons, 000 Omitted)	1,850	1,818	54,236	67,672
Ingot Index				
(1957-59=100)	93.3	97.6	93.9	117.2
Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel base (Cents per lb)	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.44	$66.44	$66.44	$66.41
Scrap No. 1 hvy (Gross ton)	$37.83	$37.17	$36.67	$31.83
No. 2 bundles	$24.50	$24.17	$24.17	$21.50

Field Training Vital to PA's

The purchasing system at Standard Pressed Steel Co. calls for PA's to be familiar with their specialized fields.

All of them came from the "field" into purchasing.

▪ Salesmen calling at Standard Pressed Steel Co., Jenkintown, Pa., must be alert and thoroughly familiar with their products.

The reason: They are up against astute buyers, each specialized in his field through actual work in it.

These men, working under the direction of John P. Moorhouse, director of purchasing, apply their knowledge in such areas as engineering, metallurgy, inspection, testing, office procedures, and law to their buying methods.

All this is no accident. It's part of a purchasing plan—a plan designed to put experts in charge of each buying area.

No Substitute—Jack Moorhouse explains the policy this way: "With some training you can readily develop a man into a buyer. Basically it's a matter of knowing where to buy and how goods are priced. But unless a buyer has some background in the equipment or material he buys, he's at a disadvantage. There's no substitute for actual experience in his field."

The varied list of SPS products — precision fasteners, aerospace fasteners, nuclear and electronic components, office and shop furniture, and shelving—calls for a wide range of raw materials buying. In machine tools alone, SPS accounts for about one pct of the yearly sales volume in the U. S. market. Also complicating the buying problem are the many SPS plants. In addition to the Jenkintown plant, there are manufacturing divisions in Santa Ana, Calif., Utica, Mich. and Fort Washington, Pa.

MULTIPLE TALENTS: Buyers at Standard Pressed Steel Co. are well versed in the products they buy. From left are: David B. Stewart, Sidney Matthews, Jack A. Trilling, Randolph A. Warden, and John P. Moorhouse.

Subsidiaries exist in the U. S. at Wyandotte, Mich., Cleveland, O., Nashville, Tenn. and in Toronto, Ont. Overseas subsidiaries are located in Ireland, West Germany and England.

Machine Tool Buyer—Heading up machine tool buying at SPS is Sidney Matthews, machine tool analyst. He joined the purchasing department four years ago after serving as the company's chief engineer.

As machine tool analyst Mr. Matthews reviews the equipment in all the company's plants. He arranges for transferring machinery from one installation to another. He works with production and engineering officials in selecting new tools for new types of production. And he disposes of obsolete machines.

Rigid Tests—Another SPS buyer, Jack A. Trilling, is responsible for purchase of materials for nuclear components. Metals used in these parts, which go into nuclear power reactors, are rigidly tested and inspected.

With a background as a mechanical engineer, Mr. Trilling is well qualified for the job. He also had experience with SPS as a machine tool operator.

David B. Stewart directs the buying of office equipment and supplies, oils, chemicals, safety equipment, and shipping supplies. Educated in business administration, he worked in the accounting department before joining purchasing.

Another member of the purchasing staff, Randolph A. Warden, is a lawyer. He reviews and interprets contracts, assists in negotiating agreements with suppliers and others, and interprets rental and lease-purchase agreements.

Announcing... IRON AGE METALWORKING INTERNATIONAL

A NEW and completely DIFFERENT kind of publication! NOT just another United States business magazine extending its circulation into other countries, but a truly international, multi-lingual business publication for metalworking and metal-producing executives throughout the world.

First issue: January 1962.

EDITORIAL

● **Objective:** To provide a full international exchange of information relating to new developments and technology on metalworking processes, equipment and materials, as well as coverage of business and economic news.

● **Staff:** A full-time editorial staff in the United States and abroad will devote its entire efforts to the international publication, backed up by qualified correspondents in 18 metalworking centers throughout the world.

● **Content:** Editorial content and balance will be guided by continuing surveys of informational requirements and preferences among key executives in metalworking companies in the countries served. Full text editorial material will be in English, with digests in German, French and Spanish.

● **Format:** The new monthly publication is uniquely suitable for effective presentation and convenient reference, from the English full-text to the German, French and Spanish digests. Square format with publication trim size 11 x 11¼, four column makeup, will provide a 7 x 10 editorial page plus one column for a multi-lingual digest. This format will also accommodate a 7 x 10 advertisement plus multi-lingual digest of the copy. New product items will be keyed and a reader service postcard provided for new products as well as advertising.

THE READER

In most cases, the reader of IRON AGE METALWORKING INTERNATIONAL will be the chief technical executive of the metalworking plant. Typically, he will be responsible for both engineering and production and will have a key role in major purchasing decisions. In larger plants, where work is dispersed among a greater number of executives, IRON AGE METALWORKING INTERNATIONAL's readers will be in four basic functions: administration, engineering, production and purchasing.

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Warehouse Prices Remain Soft

Service centers in the Midwest launched price cuts for galvanized sheets.

The reductions, which are spreading, came while mill orders for galvanized continue strong.

■ Will other warehouse price cuts follow the recent reductions in galvanized sheet?

Few distributors openly predict any. But they also point out there is price softness in other types of sheets, as well as in structurals, plates, and bars. Stainless is also "dragging."

"As far as we're concerned, there are no fixed prices on warehouse steel," says one service center sales manager.

Spreading Out—The price cuts on galvanized began in the Midwest when Central Steel & Wire Co. reduced its price on all gages of galvanized sheet from $8 to $12 a ton, depending on the grade involved. Central, which has branches in Detroit, Chicago, Cincinnati, and Milwaukee, said the cuts were to meet competition.

Later Joseph T. Ryerson & Son, Inc. announced a $2 to $12 a ton reduction. Other warehouses in the same market area declared they have or will reduce prices to remain competitive. New prices for galvanized were also posted at St. Louis, Indianapolis, and Rockford, Ill. Changes at Minneapolis and Kansas City seemed likely.

Distributor Comment — While service centers further east did not react immediately to the change, it's felt the cuts will probably spread to Cleveland, Pittsburgh and other cities.

Some distributors felt official announcement of the reductions was largely meaningless. "A contractor could probably get that much of price cut now just by shopping around," a Cleveland warehouse executive notes.

At Pittsburgh, a galvanized supplier adds, "I don't see what difference it makes. There is really no set price on galvanized anyhow."

Reasons for Cuts — Why the warehouse price cuts on galvanized, especially when mills face heavy demand for the product?

Actually it's a case of too much competition at the warehouse level, with supplies of secondary sheet depressing the market. Most large tonnage galvanized users buy from the mills.

On the other hand, warehouse sales of smaller tonnages are still competitive. Users have low inventories and buyers want fast delivery.

It's also noted that with large amounts of secondary galvanized sheets on the market, prime sheet has difficulty moving at regular prime prices.

Sheet and Strip—Mills are still waiting for automakers to place heavy tonnages for the 1962 model cars. As a result, September orders for sheet and strip are reflecting this hesitation. But this will change fast if new auto labor contracts are signed without a hitch. Meanwhile, other buyers are booking flat-rolled for September and October delivery. **Midwest** mills are even filling flat-rolled orders from overseas buyers. The tonnage on these orders can be large, ranging from 500 to 4000 tons on a single order. Most of the purchases are tied to foreign aid programs, requiring buyers to purchase the steel in the U. S.

Bethlehem Steel Co. has installed eight annealing furnaces at its Lackawanna plant for production of vitreous enameling sheet. Output of the product has begun.

Plates—Shipments slowed down in July for most mills. Fair demand from linepipe makers, oil and petrochemical markets is helping August orders. An **East Coast** mill — the Claymont, Del. plant of Phoenix Steel Corp.—has begun production of stainless steel plate.

Bars—Barmakers are building up hopes for a fourth quarter buying surge. September bookings are already strong with the main support coming from farm equipment, construction industry and some automotive accounts.

The forging bar market is already feeling the effects of the defense buildup. Mills are receiving orders from shell makers. Six-inch squares are the most wanted size.

Pipe and Tubing—Sales of butt-weld pipe for residential and commercial construction use are picking up slowly. But they are still at low levels. Mill output for pipemakers is about half the available capacity. Delivery is still on a short-term basis, in some cases supplied right out of stock in two or three days. Oil country goods are still slow.

Tinplate—Mill shipments to users are holding at about the level of the last three months. Producers expect to stay at this rate in September, but look for a drop in the fourth quarter.

PURCHASING AGENT'S CHECKLIST

Armco bets $8.5 million on call for wider galvanized. P. 42

New monomer-casting process opens the door to low-cost complex nylon shapes. P. 74

Defense buildup means $1 billion in West Coast contracts. P. 52

COMPARISON OF PRICES

(Effective August 7, 1961)

Steel prices on this page are the averages of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Aug. 7 1961	July 31 1961	July 10 1961	Aug. 9 1960
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	14.10
Stainl's C-R strip (No. 302)	49.50	49.50	52.00	52.00
Tin and Terneplate: (per base box)				
Tin plates (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	46.75
Wrought iron bars	14.90	14.90	14.90	14.90
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 10 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Aug. 7 1961	July 31 1961	July 10 1961	Aug. 9 1960
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.68	$70.68	$70.68	$70.57
Foundry, South Cin'ti.	71.92	71.92	71.92	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.11	70.11	70.11	70.07
Basic Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese 74-76 pct Mn. cents per lb‡	11.00	11.00	11.00	11.00
Pig Iron Composite: (per gross ton)				
Pig Iron	$66.41	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$35.50	$35.50	$35.50	$30.50
No. 1 steel, Phila. area	39.50	39.50	38.50	33.50
No. 1 steel, Chicago	38.50*	36.50	36.50	31.50
No. 1 bundles, Detroit	35.50	35.50	35.50	29.50
Low phos., Youngstown	40.50	40.50	40.50	34.50
No. 1 mach'y cast, Pittsburgh	45.50	45.50	45.50	47.50
No. 1 mach'y cast, Phila.	49.50	49.50	49.50	49.50
No. 1 Mach'y cast, Chicago	48.50*	47.50	48.50	46.50
Steel Scrap Composite (per gross ton)				
No. 1 hvy. melting scrap	$37.83*	$37.17	$36.67	$31.83
No. 2 bundles	24.50*	24.17	24.17	21.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	14.75-15.50	14.75-15.50	14.75-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	31.00	31.00	31.00	33.00
Copper, Lake, Conn.	31.00	31.00	31.00	33.00
Tin, Straits, N. Y.	116.50‡	117.00	116.375	103.625
Zinc, East St. Louis	11.50	11.50	11.50	13.00
Lead, St. Louis	11.00	11.00	11.00	11.80
Aluminum, ingot	26.00	26.00	26.00	28.10
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

‡ Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strip.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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*Appears in the Aug. 3-Aug. 17 issues.

PETERSON STEELS, INC.

Union, N. J. • Wethersfield, Conn.
Detroit, Mich. • Melrose Park, Ill.

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Chicago Market Points to Strength

There are signs that the scrap market is set for another round of higher prices.

Chicago prices climbed this week, after a rise last week. Other markets report a tightening of supply, more mill interest.

■ Strength continues to build up in the scrap market. For the most part, few districts report actual price gains. But there is a tightening in the supply of scrap.

Chicago reports gains of up to $2. All grades of scrap are affected. The significant jump in prices is a result of higher prices for new railroad and industrial lists. This follows by only a week gains chalked up on earlier industrial lists.

In all cases, the higher prices at Chicago are supported by fresh mill buying. And foundries add support to an already firm foundry market.

Coastal districts continue to receive support from the export market. And in some cases, domestic mills would find it hard to attract scrap without boosting prices sharply.

The IRON AGE composite price for No. 1 heavy melting steel rose to $37.83 this week.

Pittsburgh—Prices are firm in a quiet market. A mill on the fringe of the district has completed most of its buying for the current month. The mill's price of $36 for No. 1 heavy melting met with more dealer resistance than last month. But there were enough sellers at this level to provide the small tonnage needed. Another mill is offering $23 for No. 2 bundles. This price is not creating much interest. Valley prices for prime grades are drawing some scrap from this district. Railroad prices will be tested this week by unusually heavy tonnages on major list.

Chicago—Supported by gains in mill buying, price advances on new railroad and industrial scrap lists, and option purchases, the entire scrap list surged ahead at the end of last week. Prices advanced sharply at both dealer and broker levels, as the mills made their purchases. In addition, foundries began to exhibit fresh interest in what had already been a firm foundry scrap market. Gains ranged from $1 to $2 along the entire list.

Philadelphia—Export is still the backbone of the market. But in the past several weeks local mills have increased the tonnages on their weekly orders. This hasn't brought any boost in prices, but it has helped to firm the market. Yards are bare after a ship leaves port. Any tonnage order would cause a scramble for scrap.

New York—This market continues to drift along easily at current levels. Dealers are busy shipping on old orders for export. New orders for export are a little slow in coming in. Domestic business is still almost non-existent.

Detroit—A lull has settled over the market. Only strength can be traced to No. 2 bundles, which at least one local mill is eyeing. Exporters have much less tonnage at Detroit docks than a month ago, but may be rebuilding stocks. A boost in auto production will mean a much greater scrap output next month.

Cleveland—A major foundry bought 2-ft foundry steel at $35 local plus a $2 springboard. And other openhearth scrap is moving into a local mill on an inside sale at quoted levels.

Cincinnati—Dealers are still willing to sell only small amounts at present price levels. Some brokers must pay mill prices to cover their orders. Only one major area mill is in the market.

St. Louis—No. 1 heavy melting inched up $1 this week. Other scrap prices were unchanged. The undertone of the market remains strong. Extreme hot weather has all but halted collection and processing of scrap. Not much scrap is moving to mills or into yards.

Birmingham—Birmingham and Atlanta electric furnaces and several steel foundries were first-of-the-month buyers of scrap at unchanged prices on most items. Brokers report strong dealer resistance and say they are having difficulty filling orders.

Buffalo—There is no change in a very quiet market this week. And dealers say there is nothing in sight to perk up the market.

Boston—During the vacation season, market activity is at a virtual standstill. There is no domestic business, and very little export.

West Coast—Domestic mills have started buying. Prices for top steelmaking grades rose in San Francisco and Los Angeles. The flow of scrap into dealers' yards is slow. Exporting has quieted down.

Houston—Domestic market is quiet. But brokers, with ships in port or due, are paying a premium for quick delivery of No. 1 heavy melting steel for export. In Houston the price is up to $36. At Baton Rouge and New Orleans it is as high as $41.

SCRAP PRICES *(Effective Aug. 7, 1961)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	36.00 to 37.00
No. 1 factory bundles	45.00 to 46.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	18.00 to 19.00
Low phos. punch'gs plate	43.00 to 44.00
Heavy turnings	30.00 to 31.00
No. 1 RR hvy. melting	41.00 to 42.00
Scrap rails, random lgth.	46.00 to 47.00
Rails 2 ft and under	50.00 to 51.00
RR specialties	45.00 to 46.00
No. 1 machinery cast	45.00 to 46.00
Cupola cast	37.00 to 38.00
Heavy breakable cast	33.00 to 34.00
Stainless	
18-8 bundles and solids	185.00 to 190.00
18-8 turnings	110.00 to 115.00
430 bundles and solids	85.00 to 90.00
410 turnings	55.00 to 60.00

Chicago

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 dealer bundles	39.00 to 40.00
No. 1 factory bundles	44.00 to 45.00
No. 2 bundles	23.00 to 24.00
No. 1 busheling	36.00 to 37.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Low phos. forge crops	47.00 to 48.00
Low phos. punch'gs plate, ¼ in. and heavier	46.00 to 47.00
Low phos. 2 ft and under	43.00 to 44.00
No. 1 RR hvy. melting	42.00 to 43.00
Scrap rails, random lgth.	48.00 to 49.00
Rerolling rails	60.00 to 62.00
Rails 2 ft and under	50.00 to 51.00
Angles and splice bars	46.00 to 47.00
RR steel car axles	60.00 to 61.00
RR couplers and knuckles	45.00 to 46.00
No. 1 machinery cast	48.00 to 49.00
Cupola cast	43.00 to 44.00
Cast iron wheels	35.00 to 36.00
Malleable	48.00 to 49.00
Stove plate	38.00 to 39.00
Steel car wheels	45.00 to 46.00
Stainless	
18-8 bundles and solids	190.00 to 195.00
18-8 turnings	110.00 to 115.00
430 bundles and solids	95.00 to 100.00
430 turnings	55.00 to 60.00

Philadelphia Area

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	42.00 to 43.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	42.00 to 43.00
Machine shop turn.	13.00 to 14.00
Mixed bor. short turn.	16.00 to 17.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	19.00 to 20.00
Clean cast. chem. borings	29.00 to 30.00
Low phos. 5 ft and under	43.00 to 44.00
Low phos. 2 ft punch'gs	45.00 to 46.00
Elec. furnace bundles	43.00 to 44.00
Heavy turnings	27.00 to 28.00
RR specialties	44.00 to 45.00
Rails, 18 in. and under	52.00 to 54.00
Cupola cast	39.00 to 40.00
Heavy breakable cast	39.00 to 40.00
Cast iron car wheels	40.50 to 41.50
Malleable	48.00 to 49.00
No. 1 machinery cast	49.00 to 50.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	9.00 to 10.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Low phos. 18 in. and under	40.00 to 41.00
Rails, random length	42.00 to 43.00
Rails, 18 in. and under	47.00 to 48.00
No. 1 cupola cast	33.00 to 34.00
Heavy breakable cast	30.00 to 31.00
Drop broken cast	44.00 to 45.00

Youngstown

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	27.50 to 28.50
No. 1 dealer bundles	38.00 to 39.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	18.00 to 19.00
Low phos. plate	40.00 to 41.00

Cleveland

No. 1 hvy. melting	$34.50 to $35.50
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	34.50 to 35.50
No. 1 factory bundles	42.00 to 43.00
No. 2 bundles	22.50 to 23.50
No. 1 busheling	34.50 to 35.50
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Cut structural & plates, 2 ft & under	41.00 to 42.00
Low phos. punch'gs plate	36.50 to 37.50
Drop forge flashings	34.50 to 35.50
Foundry steel, 2 ft & under	34.00 to 35.00
No. 1 RR hvy. melting	39.00 to 40.00
Rails 2 ft and under	49.00 to 50.00
Rails 18 in. and under	52.00 to 53.00
Steel axle turnings	27.00 to 28.00
Railroad cast	48.00 to 49.00
No. 1 machinery cast	48.00 to 49.00
Stove plate	39.00 to 40.00
Malleable	51.00 to 52.00
Stainless	
18-8 bundles	175.00 to 180.00
18-8 turnings	100.00 to 105.00
430 bundles	80.00 to 85.00

Buffalo

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 busheling	31.00 to 32.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	14.00 to 15.00
Cast iron borings	15.00 to 16.00
Low phos. plate	37.00 to 38.00
Structurals and plate, 2 ft and under	39.00 to 40.00
Rails 2 ft and under	48.00 to 49.00
Scrap rails, random lgth.	38.00 to 49.00
No. 1 machinery cast	43.00 to 44.00
No. 1 cupola cast	37.00 to 38.00

St. Louis

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	29.00 to 30.00
Foundry steel, 2 ft	31.00 to 32.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	13.50 to 14.50
Shoveling turnings	15.50 to 16.50
Cast iron borings	22.00 to 23.00
No. 1 RR hvy. meltings	36.00 to 37.00
Rails, random lengths	39.00 to 40.00
Rails, 18 in. and under	44.00 to 45.00
RR specialties	40.00 to 41.00
Cupola cast	37.00 to 38.00
Heavy breakable cast	32.00 to 33.00
Stove plate	32.00 to 33.00
Cast iron car wheels	34.00 to 35.00
Rerolling rails	55.00 to 56.00
Unstripped motor blocks	34.00 to 35.00

Birmingham

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	38.00 to 39.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	10.00 to 11.00
Electric furnace bundles	38.00 to 39.00
Elec. furnace, 3 ft & under	36.00 to 37.00
Bar crops and plate	43.00 to 44.00
Structural and plate, 2 ft	42.00 to 43.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rail, random lgth.	41.00 to 42.00
Rails, 18 in. and under	46.00 to 47.00
Angles and splice bars	44.00 to 45.00
No. 1 cupola cast	42.00 to 43.00
Stove plate	42.00 to 43.00
Cast iron car wheels	34.00 to 35.00
Unstripped motor blocks	31.00 to 32.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	24.00 to 25.00
No. 2 dealer bundles	18.00 to 19.00
Mixed bor. and turn.	5.00 to 6.00
Machine shop turnings	1.00 to 6.00
Shoveling turnings	.00 to 8.00
Clean cast. chem. borings	19.00 to 20.00
No. 1 machinery cast	38.00 to 39.00
Mixed yard cast	34.00 to 35.00
Heavy breakable cast	32.00 to 33.00
Stainless	
1818 prepared solids	160.00 to 165.00
18-8 turnings	80.00 to 85.00
430 prepared solids	65.00 to 70.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	32.00 to 33.00
Drop forge flashings	32.00 to 33.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	13.00 to 14.00
Heavy breakable cast	28.00 to 29.00
Mixed cupola cast	30.00 to 31.00
Automotive cast	40.00 to 41.00
Stainless	
18-8 bundles and solids	170.00 to 175.00
18-8 turnings	70.00 to 75.00
430 bundles and solids	70.00 to 75.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$27.00 to 328.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	17.00 to 18.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	3.50 to 4.00
Shoveling turnings	8.00 to 8.50
Clean cast. chem. borings	17.50 to 18.00
No. 1 machinery cast	38.00 to 39.00
Mixed cupola cast	30.00 to 31.00
Heavy breakable cast	29.00 to 29.50

San Francisco

No. 1 hvy. melting	$42.00 to $44.00
No. 2 hvy. melting	39.00 to 41.00
No. 1 dealer bundles	28.00
No. 2 bundles	25.00
Machine shop turn.	$16.00 to 17.00
Cast iron borings	16.00 to 17.00
No. 1 cupola cast	45.00 to 46.00

Los Angeles

No. 1 hvy. melting	$41.00 to $43.00
No. 2 hvy. melting	38.00 to 40.00
No. 1 dealer bundles	28.00
No. 2 bundles	25.00
Machine shop turn.	15.00
Shoveling turnings	15.00
Cast iron borings	15.00
Elec. furnace 1 ft and under (foundry)	50.00
No. 1 cupola cast	46.00

Seattle

No. 1 hvy. melting	$42.00
No. 2 hvy. melting	38.00
No. 2 bundles	$25.00 to 26.00
No. 1 cupola cast	36.00
Mixed yard cast	31.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$31.00
No. 2 hvy. melting cut 3 ft and under	28.00
No. 1 dealer bundles	31.00
No. 2 bundles	23.50
Mixed steel scrap	23.00
Bush., new fact., prep'd	31.00
Bush., new fact., unprep'd	25.00
Machine shop turn.	8.00
Short steel turn.	12.00
Mixed bor. and turn.	12.00
Cast scrap	32.00

Houston

Brokers buying prices per net ton on cars:

No. 1 hvy. melting	$33.00
No. 2 hvy. melting	29.00
No. 2 bundles	22.00
Machine shop turn.	8.00
Shoveling turnings	11.00
2 ft & under	$44.00 to 45.00
Cut structural plate	
Unstripped motor blocks	29.00 to 30.00
Cupola cast	35.00 to 36.00
Heavy breakable cast	29.00 to 30.00

Alcoa Hikes Prices In Revised Book

Alcoa is revising and simplifying its price book, and adjusting prices in the process.

Major change is the removal of building sheet from the commodity pricing list.

■ Here's the story behind the "minor" price adjustments made last week by Aluminum Co. of America.

There was some confusion, because Alcoa initially announced there would be some changes, without identifying products involved or degree of change.

Actually, Alcoa has a major revision and simplification of its price lists in progress. Revised pages are being sent out to salesmen and customers as they come off the presses.

Since the entire price book will be reprinted, the company is taking the opportunity to adjust prices, usually upward, wherever possible.

Major Loss—The most important change in this group of price sheets is removal of building sheet from the commodity pricing list.

The commodity list consists of items that are purchased for one purpose within a single industry. They are priced to compete with other materials.

The price of an item on the commodity list usually bears no relation to alloys, shapes or sizes.

Building sheet is replaced by alloy 3105 sheet. Prices are up 2¢ per lb for coil, and 3¢ per lb for sheet over commodity price of building sheet.

This means the .050 gage coils now cost 38.8¢ per lb, and .050 cut to length sheets of this alloy cost 41.8¢ per lb.

Minor Moves—Alcoa says the price moves are minor and do not affect major tonnage items. It also says there is no direct relationship between the higher prices and the increase in wages its workers received on August 1.

But the move indicates the pattern of future aluminum price hikes.

First, producers have given up the idea of a higher price for their basic metal, under the current strength of the market.

The new technique: Move prices an item or two at a time, as their particular market will stand it. This means that consumers can expect higher prices for aluminum mill products by dribs and drabs over the next year or so.

Spotty Progress — Meanwhile, business continues to move up. But it is spotty.

Companies with product mix heavy in builders' items are doing very well. One company notes that July and August business is much better than the same months last year. It is, in fact, as good or better than any month this year.

But on the average, business gains continue to be steady but slow. Overall, business for producers is better than last year, but not by any large amount.

Even companies most conservative in appraising business say that summer has not taken the edge off the steady upward move of the market. And all pretty much agree that, as of right now, September is the key month—the month that will spell out what to expect for the rest of the year.

Beryllium

U. S. Beryllium Corp. has stepped up ore production to meet growing industrial demand.

From its Boomer and Redskin Mines on Badger Flats, Colo., the company is now supplying a ton per day of 8 pct and higher beryllium oxide to Mineral Concentrates and Chemical Co., Denver. This is preliminary to a full expansion program that will be under way in September.

The ore is converted by direct process into high-purity oxides. Purchasers include government contractors, research laboratories, fabricators and processors.

Monthly Average Metal Prices

(Cents per lb except as noted)

Average prices of the major nonferrous metals in JULY based on quotations appearing in THE IRON AGE, were as follows:

Electrolytic copper, del'd Conn. Valley	31.00
Copper, Lake	31.00
Straits, Tin, New York	116.25
Zinc, E. St. Louis	11.50
Lead, St. Louis	10.80
Aluminum Ingot	26.00

Note: Quotations are on going prices.

Tin Prices for the Week

August 1—116.50; August 2—116.625; August 3—117.00; August 4 — 117.00; August 7—116.50.*

*Estimate.

Primary Prices

(cents per lb.)	current price	last price	date of change
Aluminum Ingot	26.00	24.70	12/17/59
Copper (E)	31.00	30.00	5/16/61
Copper (CS)	31.00	30.00	5/17/61
Copper (L)	31.00	30.00	5/17/61
Lead, St. L.	10.80	11.80	12/13/60
Lead, N. Y.	11.00	12.00	12/13/60
Magnesium Ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	81.25	74.00	6/30/61
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	11.50	12.50	1/12/61
Zinc, N. Y.	12.00	13.00	1/12/61

ALUMINUM: 99% Ingot. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. Other primary prices, pg. 105.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.030-.037	.047-.060	.076-.096	.154-.250
1100,3003	48.4	47.4	46.4	45.4
5052	55.8	53.0	50.8	47.8
6061-0	53.0	50.3	48.4	47.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	45.3-46.8	54.0-61.8
18-32	45.8-47.5	58.6-81.5
33-38	49.5-52.2	85.1-96.6
39-44	59.8-63.6	102.0-124.0

Screw Machine Stock—2011-T-3

Size"	7/32-3/16	11/32-23/32	3/4-1 1/16	1 3/32-1 1/2
Price	60.0	59.2	57.7	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.506	$2.013	$2.515	$3.017

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type ↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	147	126	145
Strip, CR	133	114	145
Rod, bar, HR	116	95	116
Angles, HR	116	95	116
Plates, HR	139	116	133
Shot, blocks	...	93	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	56.13	.....	53.61	57.32
Brass, Yellow	49.27	49.56	49.21	53.43
Brass, Low	52.15	52.44	52.09	56.21
Brass, Rod	53.17	53.46	53.11	57.23
Brass, Naval	53.94	60.25	47.75	58.10
Muntz Metal	51.94	.....	47.25	.....
Comm. Bz.	54.73	55.02	54.67	58.34
Mang. Bz.	57.71	61.54	51.27	.....
Phos. Bz. 5%	76.97	76.72	77.47	78.90

Free Cutting Brass Rod 34.77

TITANIUM

(Base Prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 32.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be ..... $ 5.00
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $70.00
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base .... $ 1.31
Cobalt, 97-99% (per lb) ..$1.50 to $ 1.57
Germanium, per gm, f.o.b. Miami, Okla., refined ..... $29.95 to $36.95
Gold, U. S. Treas, per troy oz. $35.00
Indium, 99.9% dollars per troy oz. $ 2.25
Iridium, dollars per troy oz. ..$75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb..... 57.00
Mercury dollars per 76-lb flask f.o.b. New York ..... $188 to $191
Nickel oxide sinter at Buffalo, N. Y. or other U. S. points of entry, contained nickel 77.50
Palladium, dollars per troy oz. .$24 to $26
Platinum, dollars per troy oz. ..$82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.) 91.375
Thorium, per pg $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 32.00
- No. 120 ..... 31.25
- No. 123 ..... 30.50

80-10-10 ingot
- No. 305 ..... 36.00
- No. 315 ..... 33.75

88-10-2 ingot
- No. 210 ..... 43.75
- No. 215 ..... 40.50
- No. 245 ..... 35.75

Yellow ingot
- No. 405 ..... 27.50

Manganese bronze
- No. 420 ..... 30.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95.5 aluminum-silicon alloys
- 0.30 copper max. 23.75-24.25
- 0.60 copper max. 23.50-24.00

Piston alloys (No. 132 type) ..25.00-26.00
No. 12 alum. (No. 2 grade) ..21.75-22.25
108 alloy 22.25-22.75
195 alloy 24.75-25.75
13 alloy (0.60 copper max.) ..23.50-24.00
AXS-679 (1 pct zinc) 22.00-23.00

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½% 23.25-24.25
Grade 2—92-95% 22.00-23.00
Grade 3—90-92% 21.00-22.00
Grade 4—85-90% 20.00-21.00

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	27	26¼
Yellow brass	20⅜	18½
Red brass	23⅞	23⅛
Comm. bronze	24¾	24
Mang. bronze	19¼	18½
Free cutting rod ends	19½	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	28
No. 2 copper wire	26
Light copper	23¾
*Refining brass	24¾
Copper bearing material	23¾

*Dry Copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	28
No. 2 copper wire	26
Light copper	23¾
No. 1 composition	24
No. 1 comp. turnings	23½
Hvy yellow brass solids	19
Brass pipe	17½
Radiators	20
Aluminum	
Mixed old cast	12½—13
Mixed new clips	14½—15
Mixed turnings, dry	13½—14

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	24½—25
No. 2 copper wire	22½—23
Light copper	20¾—20¾
Auto radiators (unsweated)	16½—17
No. 1 composition	21 —21½
No. 1 composition turnings	20½—21
Cocks and faucets	17 —17½
Clean heavy yellow brass	14¾—15
Brass pipe	17 —17½
New soft brass clippings	18¾—19¼
No. 1 brass rod turnings	16½—17

Aluminum

Alum. pistons and struts	7 — 7½
Aluminum crankcase	9½—10
1100 (2s) aluminum clippings	12¼—12¾
Old sheet and utensils	9½—10
Borings and turnings	4½— 5
Industrial castings	10 —10½
2020 (24s) clippings	11 —11½

Zinc

New zinc clippings	5 — 5¼
Old zinc	3 — 3¼
Zinc routings	1¾— 2
Old die cast scrap	1¾— 2

Nickel and Monel

Pure nickel clippings	56 —58
Clean nickel turnings	43
Nickel anodes	56 —58
Nickel rod ends	56 —58
New Monel clippings	26 —26½
Clean Monel turnings	18½—19
Old sheet Monel	25 —25½
Nickel silver clippings, mixed	20
Nickel silver turnings, mixed	17

Lead

Soft scrap lead	7¼— 7½
Battery plates (dry)	3 — 3¼
Batteries, acid free	2 — 2¼

Miscellaneous

Block tin	90 —92
No. 1 pewter	65 —67
Auto babbitt	46 —47
Mixed common babbitt	10 —10½
Solder joints	15 —15½
Small foundry type	9 — 9½
Monotype	9¼— 9¾
Lino. and stereotype	8½— 8¾
Electrotype	8 — 8¼
Hand picked type shells	5¾— 6¼
Lino. and stereo. dross	1¾— 2¼
Electro dross	2½— 3

(Effective Aug. 7, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES, STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$99.50 *A2*	$121.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*	8.10 *P2*	5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.425 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G5, M2*	7.425 *M2, S1, D1, P11, B9*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3, Y1*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Struthers, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*		5.50 *Y1*			5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, N. Castle, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *B4, M10*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W3*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$94.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*	$140.00 *B2*		6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

* Electro-galvanized-plus galvanizing extras

(Effective Aug. 7, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Electro-galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.		Cokes[▲] *1.25*-lb. base box	Electro[▲▲] *0.25*-lb. base box	Thin *0.25* lb. coating in coils
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*					7.525 *B3*	9.275 *B3*	6.40 *W6*	†Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price 0.75 lb. 0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. ▲ COKES: 1.50-lb. add 25¢. ▲▲ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb. 0.25 lb. add 65¢.		Prices are for 50 lb. base box; for 45 lb. deduct 15¢; for 55 lb. add 15¢; for 60 lb. add 30¢.
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*					7.575 *A2*					
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*					7.575 *U1*	9.325 *U1*			$9.10 *U1*	$6.25 *U1*
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*		6.775 *B3*		7.525 *B3*	9.275 *B3* 10.025 *B3**	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	$6.25 *B3*
	Worcester, Mass.									6.70 *A5*			
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*		6.775 *A7*		7.525 *A7*			Hollowware Enameling 29 ga.—7.85 *U1* at Gary; Pittsburgh; *J3* at Aliquippa; *W5* at Yorkville; *Y1* at Indiana Harbor; *W5* at Wheeling; 7.95 *G2* at Granite City.		
	Canton-Massillon, Dover, Canfield, Ohio			6.875 *R1, R3*	7.50 *C19*								
	Chicago, Joliet, Ill.	5.10 *W8, A1*						7.525 *U1, W8*		6.40 *A5, R3,W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*		7.65 *R3*	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*	6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*					7.525 *G3*	9.275 *G3*				
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3,Y1*	6.275 *U1, I3,Y1*	6.875 *U1, I3*		6.775 *U1, I3,Y1*	7.225 *U1*	7.525 *U1, Y1,I3*	9.275 *U1, Y1*	6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1Y1,*	$6.25 *U1,I3*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*				7.225 *E2*						
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	7.225 *A7*	6.775 *A7*	7.225 *A7*						
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3*	7.65 *R3*	6.775 *S1*	7.225 *S1*†† *R3*	7.525 *R3, S1*	9.275 *R3*			$9.10 *R3*	
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	5.10 *U1, J3,P6*	6.275 *U1, J3,P6*	6.875 *U1, J3*	7.50 *E3*	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3* 10.125 *U1, J3**	6.40 *A5, J3,P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	$6.25 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3,W5*	6.875 *W3, W5*	7.50 *W3*		7.225 *W3*	7.525 *W3*	9.275 *W3*		$10.40 *W5, W3*	$9.10 *W5, W3*	$6.40 *W5*** $6.25 *W3*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*			6.775 *Y1*		7.525 *Y1*	9.275 *Y1*	6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*					8.25 *K1*	10.40 *K1*		$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*		6.775 *T2*				6.40 *T2,R3*	$10.40 *T2*	$9.10 *T2*	$6.25 *T2*
	Houston, Texas									6.65 *S2*			

* Hi Str. Low Alloy Galv. ** For 55 lb.; for 60 lb. add 15¢.

†† 7.425 at Sharon; Niles is 7.225.

(Effective Aug. 7, 1961)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.		Listing reinforcing bar prices has been suspended. Major producers now quote prices only in response to specific inquiries.		6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*		7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *P2*	6.375 *P2*	7.50 *P2*	7.95 *P2*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Milton, Pa.	5.825 *M7*										
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*			6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Steelton, Pa.											
	Fairless, Pa.	5.825 *U1*										
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.							5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*		7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,J3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*		7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*		7.90 *P3* 7.85 *P8B5H2* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8, H2* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*		7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, Y1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.											8.10 *C9*
	Sterling, Ill.	5.775 *N4*					7.925 *N4*	5.30 *N4*			7.625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C19*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*		7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Youngstown, Steubenville, O.	5.675 *U1,R3, Y1*		7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1,W5, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.375 *K1*			7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*			6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*		9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, B3*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*						6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*										
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*					9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*			7.825 *B2*		9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga. Jacksonville, Fla.	5.875 *A8*										8.00 *A8* 8.35 *M4*
	Fairfield, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*		8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas, Sand Springs, Okla.	5.925 *S2*			6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher.

* Special Quality.

(Effective Aug. 7, 1961)

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brooke Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.
B9 Barry Universal Corp., Detroit, Mich.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C15 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.
C19 Canfield Steel Co., Canfield, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B. Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owensboro, Ky.

H1 Hanna Furnace Corp., Detroit
H2 Hercules Drawn Steel Corp., Toledo, O.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M10 Mill Strip Products Co., of Pa., New Castle, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Calif.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Div., Elox & Laughlin, Inc., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery; Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore	$.10	9.60	10.16	10.16	11.35	9.70	9.95	8.65	11.80	17.48	16.48	21.58	20.83
Birmingham		8.46	10.20	10.59	9.45	8.41	8.47	8.26	13.14	18.84	16.65	22.94	22.19
Boston**	.10	10.00	10.50	11.62	12.50	9.95	10.60	10.15	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	9.45	10.20	11.95	11.85	9.55	10.05	9.60	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	9.37	10.35	10.28	11.54	9.21	9.72	9.37	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	9.53	10.41	10.90	11.86	9.59	10.29	9.48	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	9.37[1]	10.21	11.07	11.66	9.45	10.11	9.48	11.40	17.21	16.21	21.31	20.56
Denver		11.55	12.53	13.03	13.72	11.39	11.90	11.55	12.98	.....	.....	.....	20.84
Detroit**	.15	9.63	10.61	10.65	11.91	9.58	10.29	9.68	11.16	17.38	16.38	21.48	20.73
Houston**		8.67	9.48	11.35[3]	10.23	7.91	8.31	8.08	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	10.53	11.37	10.95	12.70	10.39	10.91	10.55	11.72	17.17	15.87	21.87	21.12
Los Angeles		10.35[1]	12.15	12.10	12.40	10.30	10.45	10.25	14.20	18.30	17.35	22.90	22.20
Memphis	.15	9.78	10.50	10.95	11.44	9.47	9.82	9.67	12.85	18.59	16.68	22.69	21.04
Milwaukee**	.15	9.51	10.49	10.42	11.68	9.35	9.94	9.51	11.04	17.24	16.24	21.34	20.59
New York**	.10	10.17	10.88	11.45	12.47	10.32	11.00	10.54	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	9.60	10.10	10.76	11.35	9.70	9.95	9.75	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	9.37	10.81	11.68	11.64	9.21	9.72	9.37	11.40	17.10	16.10	21.20	20.45
Portland		10.40	12.25	12.35	12.40	10.55	11.00	10.40	16.65	18.60	17.85	22.70	22.15
San Francisco	.10	10.75	11.75[2]	11.95	12.80	10.90	11.20	10.65	15.20	18.30	17.35	22.90	22.20
Seattle		11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.20	18.60	17.85	22.70	22.15
Spokane	.15	11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.35	17.75	17.95	21.58	22.30
St. Louis**	.15	9.57	10.73	10.66	11.74	9.43	9.95	9.59	11.43	17.48	16.48	21.58	20.83
St. Paul	.15	9.72	10.39	11.54	11.89	9.56	10.07	9.72	11.61		16.69		21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars, 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **These cities are on order quantity pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—$\frac{1}{8}$" x 1"; Plate—$\frac{1}{4}$" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—$\frac{3}{4}$ x 15/16". Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1$\frac{5}{8}$" to 2$\frac{7}{8}$"; cold drawn—15/16" to 2$\frac{7}{8}$" round; Hot-rolled 4140—$\frac{5}{8}$" to 2$\frac{7}{8}$" round, cold drawn—15/16" to 2$\frac{7}{8}$" round.

†† 13c zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier: [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120

(Effective Aug. 7, 1961)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	66.50	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	71.00†
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Lyles, Tenn. *T3*	.....	.....	.....	.....	73.00
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.00	.....
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
Sp. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	71.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31 0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4*, Toledo, *I4*, $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct; 13 to 13.5 pct; 13.5 to 14 pct, add $1. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container) — Pct

Plain finish—packaged and bulk	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container) — Pct

Plain finish—packaged and bulk	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

Plain finish—packaged and bulk	42
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

(Minimum plating charge — $10.00 per item. Price on application assembled to bolts.)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46

Machine Screws—bulk

No. 3 in. diam or smaller	25,000 pcs	50
5/16, 3/8 & 1/2 in. diam	15,000 pcs	50

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
1/4 in. diam or smaller	25,000 pcs	
5/16 or 3/8 in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 lb
1/2 in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

NOTE: Ferroalloy prices are published in alternate issues.

TOOL STEEL

f.o.b. mill

W	Cr	V	Mo	Co	per lb	AISI
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective Aug. 7, 1961)

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	25.00	28.25	26.00	29.50	32.00	29.50	47.50	38.00	46.50	—	19.25-21.50	—	19.75-21.75
Billets, forging	—	37.75	38.75	39.50	42.50	39.50	64.50	48.75	57.75	26.75	29.25-26.75	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	46.75	75.75	57.50	67.25	31.50	35.00-31.50	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25-31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	52.00	80.75	65.50*	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	40.50	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	43.50	46.75	45.00	49.50	56.75	49.50	76.75	62.25	75.25	40.25	40.25	42.50	38.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	44.25	71.75	54.50	63.75	29.75	33.25-29.75	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A5*; Butler, Pa., *A7*; Vandergrift, Pa., *U1*; Washington, Pa., *W2*, *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Detroit, *M2*; Louisville, O., *R3*.

Strip: Midland, Pa., *C11*; Waukegan, Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville Pa., *U2*; Detroit, *M2*; Detroit, *S1*; Canton, Massillon, O., *R3*; Harrison, N. J., *D3*; Youngstown, *R5*; Sharon, Pa., *S1*; Butler, Pa., *A7*, Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13*, (25¢ per lb. higher); New Bedford, Mass., *R6*; Gary, *U1*, (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7*; S. Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; S. Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*, *R3*; Ft. Wayne, *I4*; Detroit, *R5*; Gary, *U1*; Owensboro, Ky., *G5*; Bridgeport, Conn., *N8*; Ambridge, Pa., *B7*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *I4*; Newark, N. J. *D2*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*, Detroit, *R5*; Reading, Pa., *C2*; Bridgeport, Conn., *N8* (down to and including 1/4").

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*; S. Chicago, *U1*.

Plates: Ambridge, Pa., *B7*; Baltimore, *E1*; Brackenridge, Pa., *A5*, Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*, Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Vandergrift, Pa., *U1*; Gary, *U1*; Claymont, Del. *P2*.

Forging billets: Ambridge, Pa., *B7*; Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*; Munhall, Pa., S. Chicago, *U1*; Owensboro, Ky., *G5*; Bridgeport, Conn., *N8*; Reading, Pa., *C2*.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld	Merch. Wire Galv.
	Col	Col	Col	Col	Col	¢/lb.	¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3***	173	190	...	...	190	9.00	9.675
Atlanta *A8***	173	191	...	212	197	9.00	9.75
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Chicago *W7*	173	.....	.....	.....	.....	9.00	9.55‡
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dsv. *M4***	175	192	...	214	198	9.10	9.80
Donora Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2**	178	192	...	217	198	9.25	9.80‡
Jacksonville *M4*	175	192	...	214	198	9.10	9.80‡‡
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80‡
Minnequa *C6*	178	192	182	217	198‡	9.25	9.80‡
Palmer, Mass *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.95	10.50
Rankin Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	.....	.....	...	236	.....	9.95	10.50
Sparrows Pt. *B3***	175	.....	...	215	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only. ‡‡ 0.115¢ zinc.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½ 4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B5*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	†10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B5*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.50¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.6
Chicago	140.0
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

Furnace, beehive (f.o.b.)	Net-Ton
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

IMPORTANT SAVINGS

Lower initial cost
Long life
Ultra high quality

Small Diameter
ROLLS

Special alloys with tough, fine-grained finish. Surfaces as fine as 3 micro inches RMS. Chrome plating available.

RECONDITIONING:
Rolls reconditioned like new at costs averaging 25% of new rolls. Rolls can be reconditioned several times!

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QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

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THE WHELAND FOUNDRY
DIVISION OF GORDON STREET, INC.
CHATTANOOGA 2, TENN.

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U. S. GOV'T SURPLUS
STEEL FOUNDRY
Located in San Francisco Bay Area Industrial tract between Pittsburg and Antioch, California
Formerly Pacific Ordnance Steel Foundry
SEALED BID OPENING SEPTEMBER 13, 1961
(3:00 P.M. PDT)

★ Ready to operate Steel Foundry consisting of 31 Foundry, Utility and Administrative buildings on approximately 41.146 acres. Buildings and equipment maintained in a "ready status." ★ Strategically located in rich, Pittsburg Antioch Industrial Area and adjacent to existing Columbia-Geneva Steel Mill, Shell Chemical Co., U.S.Steel, Linde Air Products, Pacific Gas & Electric, etc. ★ 50 minutes from San Francisco-Oakland Bay Area with easy access via State routes #24 and #4. Proposed freeway will link area with Oakland within a few years. ★ Adequate existing residential area housing industrial workers nearby . . . new residential sub-divisions developing rapidly. ★ Served by Santa Fe Railroad spur track. Located near shipping channels. ★ Attractive Financing.

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Public Buildings Service • Business Service Center
49 Fourth St. • Phone YUkon 6-3500, Ext. 3204
San Francisco, California

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25			
Cleveland *R5*						15.35
So. Chicago *R3*				10.10		
Ensley *T2*	5.75	6.725				
Fairfield *T2*		6.725		10.10	6.875	
Gary *U1*	5.75				6.875	
Huntington, *C16*		6.725				
Ind. Harbor *I3*				10.10		
Johnstown *B3*		6.725				
Joliet *U1*			7.25			
Kansas City *S2*				10.10		15.35
Lackawanna *B3*	5.75	6.725	7.25		6.875	
Lebanon *B3*			7.25			15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*						15.35
Pittsburgh *J3*				10.10		
Seattle *B2*					7.025	15.85
Steelton *B3*	5.75		7.25		6.875	
Struthers *Y1*				10.10		
Torrance *C7*					6.75	
Williamsport *S5*		6.725				
Youngstown *R3*				10.10		

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	9.10				
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*		10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70		
Detroit *D1*	9.05	10.50	12.70	15.70	
Detroit *D2*	9.05	10.50	12.70		
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	15.60	
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*			12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	
New Britain, Conn. *S7* [a]	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	
New Castle, Pa. *M10*	8.95	10.40	12.60	15.60	
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*		10.70	12.90	16.10	19.30
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper

Rolled elliptical, 18 in. or longer, 5000 lb lots 43.50
Electrodeposited, 5000 lb lots 36.50
OFHC anodes ..... 41.50 to 44.50
(depending on shape)
Brass, 80-20, ball anodes, 2000 lb or more 50.50
Zinc, ball anodes, 2000 lb lots 18.75
(for elliptical add 1¢ per lb)
Nickel, 99 pct plus, rolled carbon, 5000 lb 1.03
(Rolled depolarized add 3¢ per lb)
Cadmium, 5000 lb 1.60
Tin, ball anodes $1.26 per lb (approx.).

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum, N. Y.. 65.90
Copper sulphate, 25.2 Cu min, 6000 lbs per cwt, Detroit 17.45
Nickel sulfate, 5000 lbs 31.00
Nickel chloride, freight allowed, 100 lb 17.50
Sodium cyanide, domestic, del'd east of Rockies, 200 lb drums.... 25.80
Zinc cyanide, 100 lb, N. Y. 60.75
Potassium cyanide, 100 lb drum N. Y., del'd east of Rockies..... 46.50
Chromic acid, flake type, 10,000 lb or more, N. Y. 30.44

METAL POWDERS

(Cents per lb, f.o.b. shipping point for ton lots or over, except as noted)

Iron Powders

Molding grade, domestic and foreign, 98 pct Fe, 100 mesh bags, freight allowed east of Miss. R. 11.50
Electrolytic Iron, melting stock, 99.87 pct Fe, truckload lots 25.75
Carbonyl Iron (200 lb lots) 88.00
Welding Grades 8.10
Cutting and Scarfing Grades 9.85
Hydrogen reduced, domestic 11.25

Copper Powders

Molding Grades
Electrolytic, domestic, f.o.b. shipping point. 15.00†
Atomized ..... 44.3 to 62.3
Reduced ..... 15.00†
Chemically Precipitated 45.5
Brass, 5000-lb lots ..... 33.1 to 50.3
Bronze, 5000-lb lots ..... 51.5 to 56.8
Chromium, electrolytic 5.00
Lead ..... 7.50†
Manganese, electrolytic ... $1.00
Molybdenum ..... $3.60 to $4.35
Nickel $1.15
Carbonyl Nickel, 20,000 lb lots $1.01
Nickel-Silver, 5000 lb lots.. 56.0 to 68.0
Silicon 70.00
Solder ..... 7.00†
Stainless Steel, 316 ..... $1.07
Stainless steel 304 ..... 89.00
Tin ..... 15.00†
Titanium, 99.25 + pct, per lb. f.o.b. $11.25
Tungsten, carbide grades... $3.25
Zinc ..... 19.5 to 32.7

† Plus cost of metal.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field		9.875	
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor		12.475	
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30	Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, P2, A3, J2*) 10 pct	15 pct	20 pct	Sheet (*I2*) 20 pct
Stainless Type	302				37.50
	304	28.80	31.55	34.30	39.75
	316	42.20	46.25	50.25	58.25
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	
	410	22.70	24.85	27.00	
	430	23.45	25.65	27.90	

CR Strip (S9) Copper, 10 pct, 2 sides, $43.85; 1 side, $36.60.

(Effective Aug. 7, 1961)

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.... $185.00
High duty (except Salina, Pa., add $5.00) 133.00
Medium duty 125.00
Low duty (except Salina, Pa., add $2.00) 103.00
Ground fire clay, net ton, bulk... 22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala. $158.00
Childs, Hays 163.00
Chicago District 168.00
Western Utah 183.00
California 185.00
Super Duty
Hays, Pa., Athens, Tex., Windham, Warren, O. 163.00-168.00
Silica cement, net ton, bulk, Chicago 26.75
Silica cement, net ton, bulk, Ensley, Ala. 27.75
Silica cement, net ton, bulk, Mt. Union, Pa. 25.75
Silica cement, net ton, bulk, Utah and Calif. 39.00

Chrome Brick

Standard chemically bonded, Baltimore, Md. $620.00
Gary, Ind. 658.50
Standard, Pascagoula, Miss. 647.50
Standard chemically bonded, Curtiner, Calif. 119.00
Burned, Baltimore 585.00

Magnesite Brick

Standard, Baltimore $715.00
Chemically bonded, Baltimore 655.00
Chemically bonded, Pascagoula, Miss. 682.50

Grain Magnesite

St. $\frac{3}{8}$ to $\frac{1}{2}$-in. grains
Per net ton

Domestic, f.o.b. Baltimore in bulk. $73.00
Domestic, f.o.b., Pascagoula, Miss... 80.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.
in bulk 46.00
in sacks 52.00-54.00

Dead Burned Dolomite

F.o.b. bulk, producing points in:
Pa., W. Va., Ohio $16.75
Missouri Valley 15.60
Midwest 17.00

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	27.25	40	100, 110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox..	2	13	40.28	47.21	35.74
Jones & Laughlin *	2½	12	54.23	63.57	48.13
Ohio Seamless Tube	3	12	62.62	73.40	55.59
Div., Copperweld	3½	11	73.11	85.70	65.84
Steel Co.*	4	10	97.08	113.80	88.10
National Tube.....	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel...	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

* Electricweld only.

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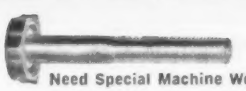

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1000	900	Al.-Ch.	2300	ANY
700	720	G. E.	440	I-M
600	1800	G. E.	4160	M-6345
500	1200	G. E.	440	M-6345Z
400	1200	West.	2300	CW
400	720	G. E.	440	MT-573Y
350	1800	Al.-Ch.	2300	ARYW
300	900	G. E.	440	IM-17

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KW	MAKE	A.C.V.	D.C.V.
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1250	West.	4160 2300	250
1000	West.	4160 2300	250
750	G. E.	4160 2300	250
600	G. E. (3 unit)	2300 440	125 250
500	G. E.	2300	250
400	Al.-Ch.	2300 440	125 250
250	G. E.	2300	250
200	G. E.	2300	250
150	West.	440	250

D. C. MOTORS

HP	RPM	MAKE	VOLTS	TYPE
1300	300	West.	250	TEFX
850	250 500	West.	250	QM
600	250 500	G. E.	600	DBL. ARM
500	210	G. E.	250	MCF
400	1150	REL	250	T-1970
400	300 900	G. M. (2)	250	D4D
300	575 1150	West.	250	CB-509
200	700	West.	250	SK-201
150	380 1000	G. E.	250	MCF
150	1150	G. E. (2)	250	RC-37

SQUIRREL CAGE MOTORS

HP	RPM	MAKE	VOLTS	TYPE
1500	1800	Al.-Ch.	2300	Ventilated
1250	3600	Al.-Ch.	4000	DP.PF
800	600	West.	2300	CS-44
600	600	West.	2300	CS-12
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500	1200	G. E.	2300	FT-567
350	1200	West.	440	CS-3255-6H

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PITTSBURGH 22, PENNSYLVANIA

Detroit Dealers Are Optimistic

Used machinery dealers in the Detroit area are suffering from the summer slump.

But there is generally a lot of optimism over a pickup in the fall. It might materialize.

■ The summer doldrums plague the Detroit used machinery market.

Business hasn't been exceptional at any time this year, according to dealer reports. But since warm weather set in, the sales pace has slackened.

There are exceptions. "June was our best month," says one Detroit dealer. "I don't know why. I guess we just had the right machine at the right time."

Most others say their business gave evidence of strength early in the year only to be followed by a complete reversal in spring and summer.

What Next?—They hope for a pickup in the fall. And they might get it if independent tool and die shops receive the orders they expect to land for 1963 model automobile programs. These involve some extensive changes at some companies.

If tool and die shops get their releases in September, it might follow that they will be looking for some machinery soon after they get the go-ahead on their jobs.

Whether prices will hold in September is something for customers to consider. Prices have been holding the line pretty steadily so far this year.

There has been a price decline on some goods. Sometimes, a dealer will take a chance on dropping the price on a certain machine. But in many cases these bargain efforts haven't panned out.

Hold the Line—This is leading some dealers to believe the best thing to do is just hold the line on prices and wait for an interested customer to come along. Price cutting hasn't seemed to stimulate customer interest. So dealers figure it isn't the answer to improving business right now.

The recent setup in defense spending and the Berlin crisis has been the subject of conversation of Detroit dealers. They say it hasn't affected business. But they think it could inevitably prime the used machinery pump.

One thing dealers point out on the optimistic side is that government sales of machinery is slowing down. There are fewer government releases these days. But there are still auctions popping up.

Surpluses — Right now there seems to be a surplus of practically every type of machine. Anybody can get what they want, so there is a great deal of price negotiating. This means that many dealers are competing for one sale.

So far 1961 has been as good as 1960 in sales. In some cases profits have been better than last year. And some dealers say there has been a general feeling of optimism since the election last fall. But this feeling hasn't yet turned into dollars and cents.

Apparently holding up well in the market are automatic screw machines, even those 20 years old. Plenty are available but demand is still sound. There are other reports of a good amount of inquiries for hand milling machines.

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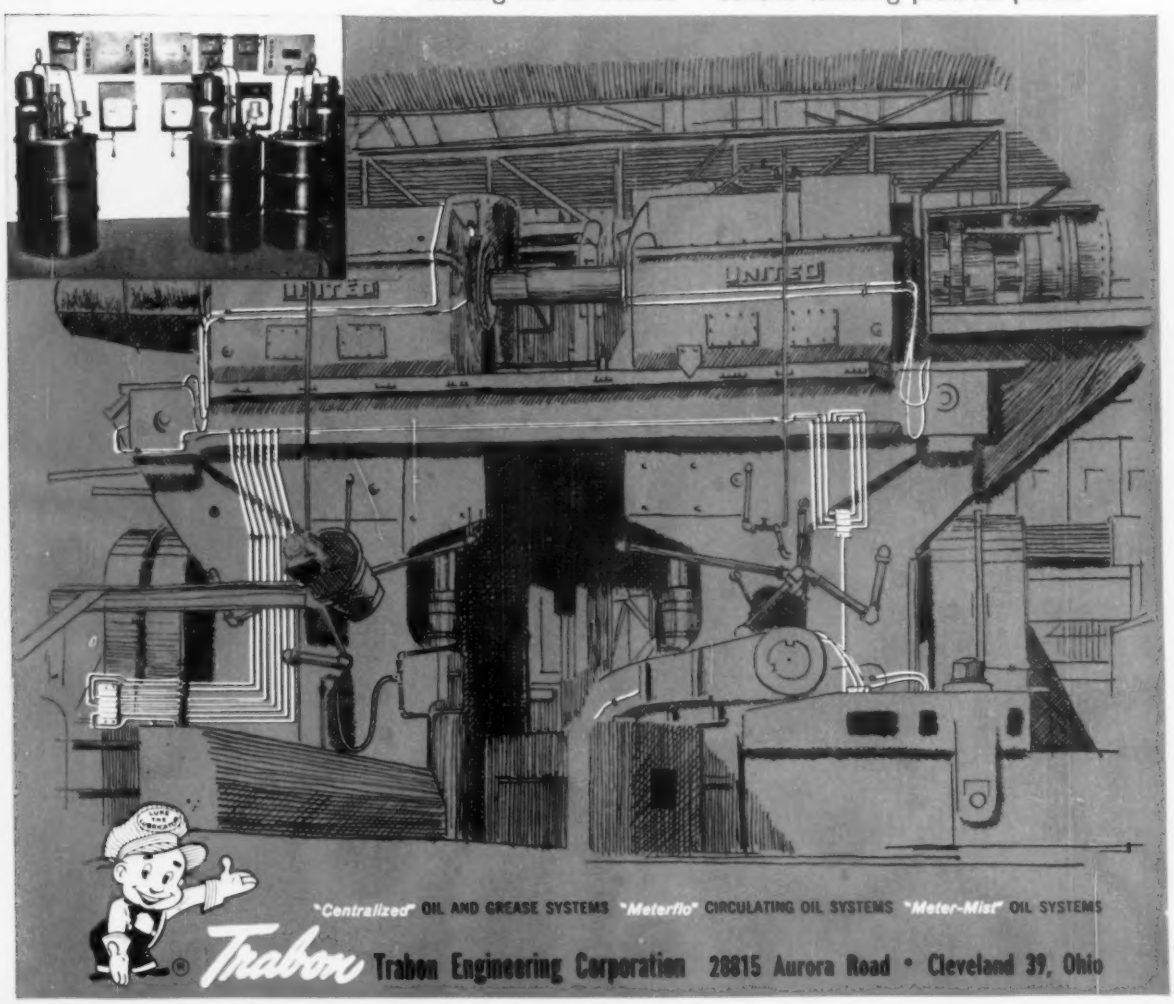

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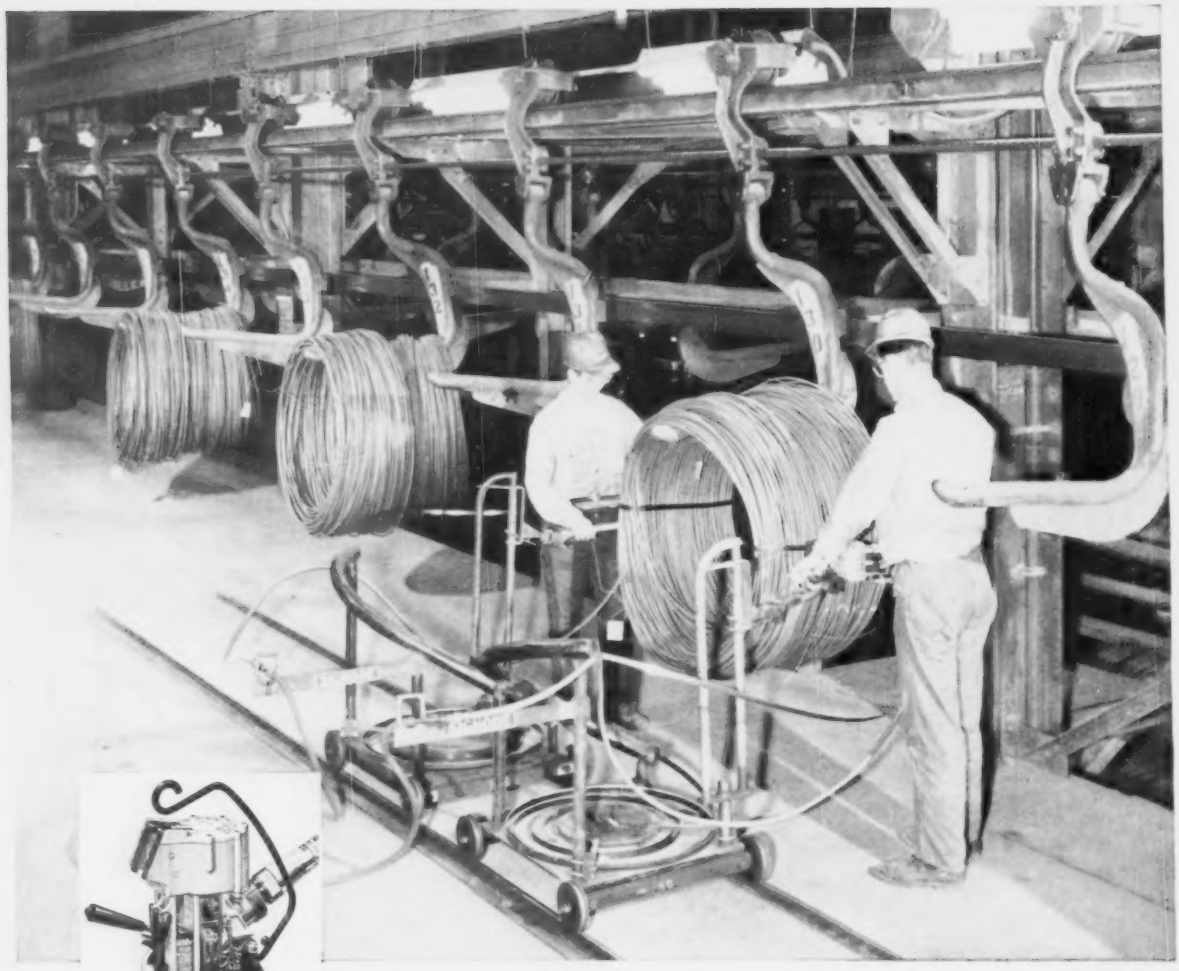

Bundle two 900-pound coils on moving conveyor in 30 seconds

Two operators—each using a Signode AMP all-power strapping tool and working in unison—put two steel straps around two 900-pound coils of green rod in 30 seconds!

This setup, which permits making full use of the speed of the AMP, was developed by the manufacturer. It incorporates a mobile strapping station that rolls on tracks paralleling the conveyor line. As the operators work, they move along with the conveyor hook that holds the two coils being strapped. When the strapping operation is completed, they move back to the starting point...30 seconds later. Coils are compressed 30% by the strapping.

The Signode AMP is compact, well-balanced, weighs only 22 pounds. Press a trigger and air power tensions the strapping; press another and air power seals and cuts off the strapping from the coil. The AMP uses new, easy-loading NESTACK seals, which come in nested stacks that eliminate waste and delay. The tool is available for ⅝″ and ¾″ strapping, .015″ to .035″ gauge. Special high-tension models are available.

Let us send you additional information on the Signode AMP tool, or, if you prefer, call the Signode man near you.

First in steel strapping

SIGNODE

STEEL STRAPPING CO.

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